

September 4-10 1987

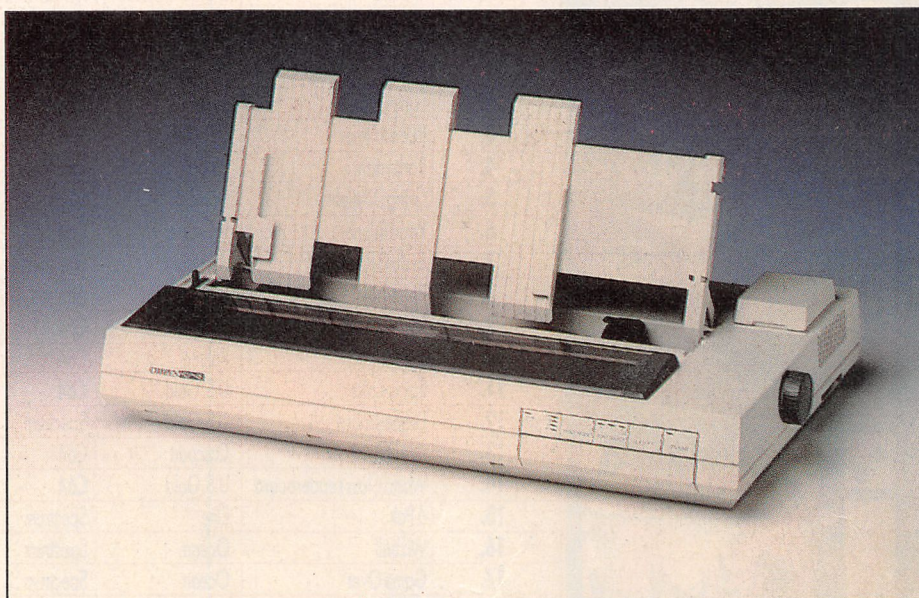
Vol 6 No 35 60p

# POPULAR Computing WEEKLY

## HARDWARE

Upgrading your  
printer?

24-pin dot matrix  
models surveyed



*Moebius from Microprose*

## NEWS DESK

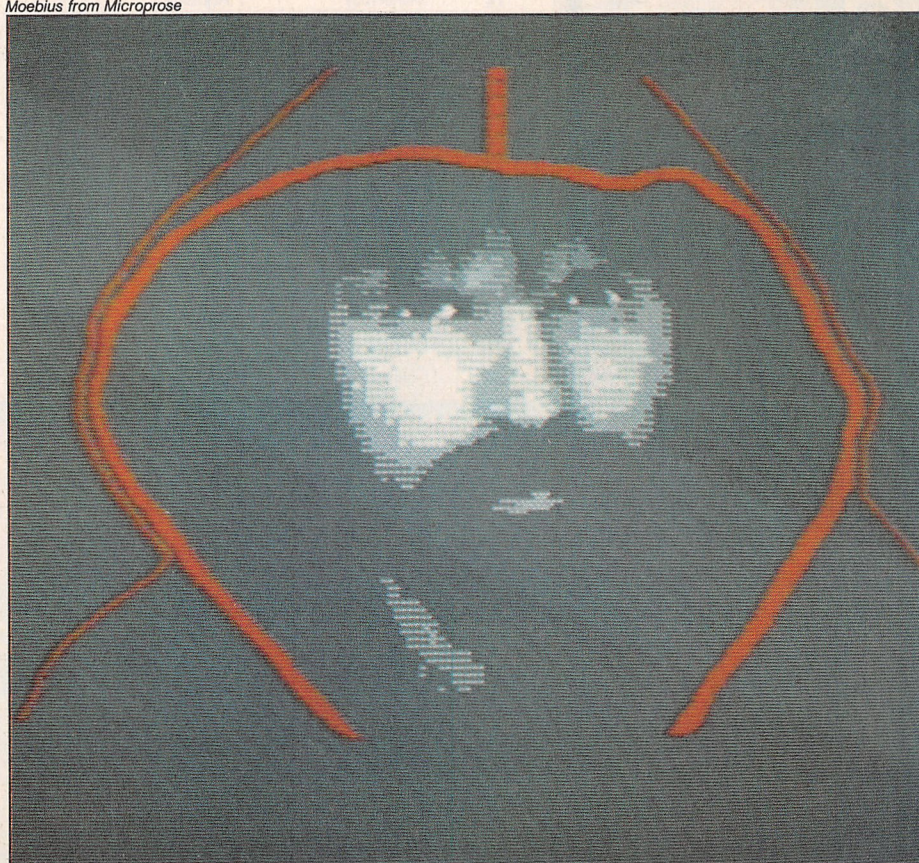
Pressure on to  
cut price of  
Amiga 500

Pirates arrested  
in Torquay

## GAMES

Mystic martial  
arts in Moebius

Accolade's Comics





ATARI

COMMODORE

SPECTRUM

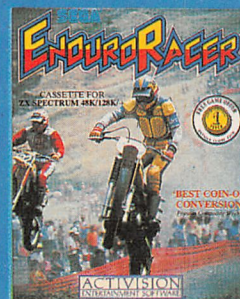
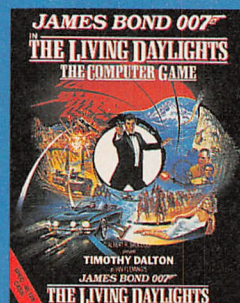
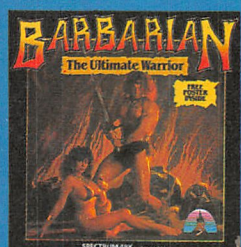
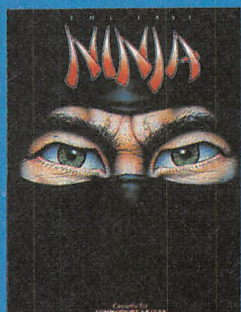
# WOOLWORTHS

## TOP 30

### COMPUTER SOFTWARE

SEPTEMBER 1987

POSITION	TITLE	SOFTWARE HOUSE	MACHINE TYPE	PRICE
1.	Exolon	Hewson	Spectrum	7.99
2.	Last Ninja	System 3	C64	9.99
3.	Road Runner	U.S. Gold	Spectrum	8.99
4.	Barbarian	Palace	Spectrum	9.99
5.	Living Daylights	Domark	Spectrum	9.95
6.	Road Runner	U.S. Gold	C64	9.99
7.	Enduro Racer	Activision	Spectrum	9.99
8.	Paperboy	Elite	Amstrad	8.95
9.	Living Daylights	Domark	C64	9.95
10.	Barbarian	Palace	C64	9.99
11.	Epyx's Epics	U.S. Gold	C64	9.99
12.	Leaderboard	U.S. Gold	Spectrum	9.95
13.	Ace 2	Cascade	C64	9.99
14.	World Class Leaderboard	U.S. Gold	C64	9.95
15.	6 Pak	Elite	Spectrum	9.95
16.	Wizball	Ocean	Spectrum	7.95
17.	Game Over	Ocean	Spectrum	7.95
18.	Wonderboy	Activision	C64	9.99
19.	World Games	U.S. Gold	Spectrum	8.99
20.	F15 Strike Eagle	Microprose	Spectrum	9.95
21.	Trio	Elite	Spectrum	9.95
22.	Pirates	Microprose	C64	14.95
23.	Big 4	Durrell	C64	9.95
24.	Paperboy	Elite	C64	9.95
25.	Wonderboy	Activision	Spectrum	9.99
26.	Paperboy	Elite	Spectrum	7.95
27.	Trio	Elite	C64	9.95
28.	6 Pak	Elite	Amstrad	9.95
29.	Exolon	Hewson	C64	9.99
30.	Gauntlet	U.S. Gold	Spectrum	8.99



# WOOLWORTHS

*A Great Deal in Entertainment*



\* At selected larger stores. Mastertronic games at £1.99 and £2.99

\* Items subject to availability

COMMODORE

SPECTRUM

AMSTRAD



# September 4-10

# CONTENTS

POPULAR  
**Computing**  
WEEKLY

## News

**6 News Desk** Commodore's stance on grey imports ... pirates arrested in Torquay ... new PC clone from Zenith ... pressure to cut prices on Amiga 500.

**36 Communications** The infamous Steve Gold with a beginner's guide to communications; the jargon and the hardware.

**40 Soundcheck** Mark Jenkins answers queries about recording packages for the Commodore 64, and has news of a new debut product from Softworks.

## Features

**14 24-Pin printers** Most dot-matrix printers used in the home are 9-pin, but 24-pin machines can give much higher resolution. Some can be pretty expensive, but we've gathered together some of the cheaper ones available.

If you've ever considered buying a new printer, Tony Kendle and Chris Jenkins' selection is worth a look.

**17 Sound Effects** Kenn Garroch kicks off a new series on learning to program your computer's sound chip, with an explanation this week of some of the features of computer sound.

**19 Graphics** Francis Botto shows how to achieve 3D graphics effects, using matrices with an example program.

## Programming

**22 Listings** This week we finish off our Sprite Animation program for the BBC, and the Custom RSX Manager for the Amstrad CPCs.

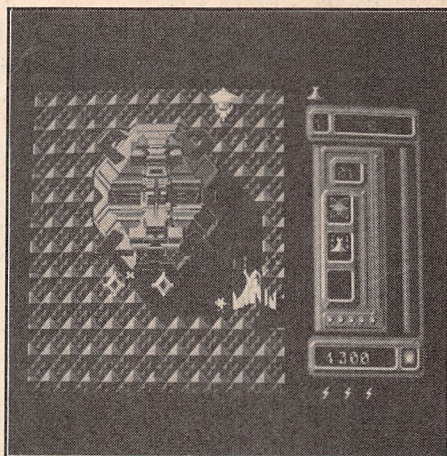
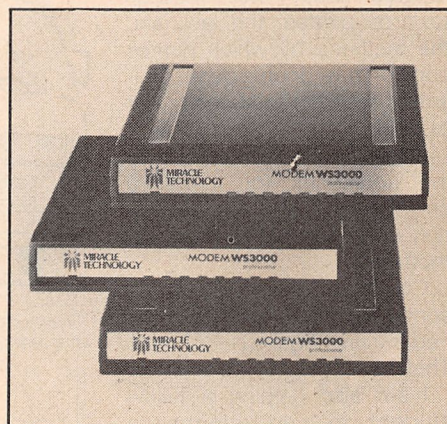
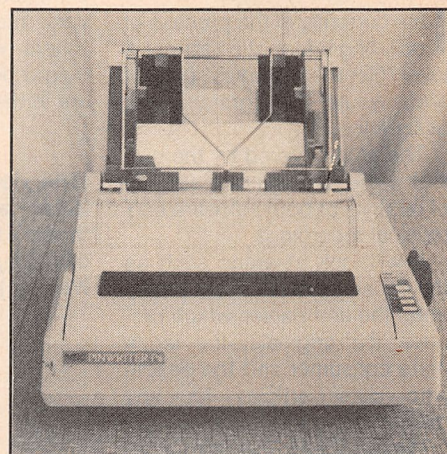
The assembler/disassembler for 8-bit Ataris continues, and there's part one of Catacombs, a Spectrum arcade style game with a built-in editor.

**31 Bytes and Pieces** Short routines for you to type in, including an ST Basic routine, utilisation of the Atari XL/XE's soundchip and one for the Commodore 64.

**29 Peek and Poke** Kenn Garroch answers your programming queries.

## Games

**41 New Releases** Your complete guide to all the software released this week, including the Amiga version of the shoot 'em up *Goldrunner* and *Accolade's Comics*. Plus *Moebius*, from Microprose, the latest martial arts bash - with a dash of mysticism and Confucian philosophy.



Top: the NEC P6 one of the 24-pin dot matrix models in our selection. Above: the WS3000 modems, suitable for the comms beginner. Below: *Goldrunner* from Microdeal

**Editor** Christina Erskine **News editor** John Brissenden **Features editor** Cliff Joseph **Technical editor** Duncan Evans **Marketing and Advertisement manager** David Osen **Advertisement executive** Athena Peerman **Classified manager** Susannah King **Classified executive** Robert Cole **Editorial secretary** Annmarie Allan **Administration** Carol Frith **Credit control manager** Gabriella Piscina **Managing editor** Peter Worlock **Publishing director** Jenny Ireland. **Published by** Sunshine Publications Ltd, 12-13 Little Newport Street, London WC2H 7PP. Tel 01-437 4343 Telex 296275 Fax 01-439 0681 **Typeset by** Magazine Typesetters, 6 Parnell Court, East Portway, Andover, Hampshire. **Printed by** McCorquodale Magazines, Andover, Hampshire. **Distributed by** S M Distribution, London SW9, Tel 01-274 8611, Telex 261643.  
© Sunshine Publications Ltd 1987. ISSN 0265-0509

**ABC**

**How to submit articles** Articles which are submitted for publication should not be more than 2000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here - so please do not be tempted. We cannot guarantee to return your programs - so please do not send your only copy. **Accuracy** Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

**Popular Computing Weekly. Tel: 01-437 4343.**



# LETTERS

## Piracy – cause and effect

I am currently in the process of collating information for my A level General Studies project and would be grateful for assistance.

The area covered by the project is the controversial subject of piracy – of both software and musical recordings.

It will look at areas such as the causes and effects of piracy upon the companies which produce the originals, the legitimate consumer and the people who copy articles for any reason.

I would like to hear from other readers about their feelings towards pirates, the law, and the methods by which pirates copy – are double-deck cassette recorders abused, for example?

If the people who reply give me addresses for reference only, I will withhold this information upon request if they fear reprisals.

Could you please give me a contact address for FAST, the Federation Against Software Theft?

I am also helping a fellow student to find information about people's feelings about computers in social and environmental fields, the uses of computers today and future for control in the workshop and the home.

Richard Colley  
87 Southbourne Avenue  
Alumwell Estate  
Walsall

West Midlands WS2 9UG  
You can contact FAST on 01-430 2408.

## Is copying necessary?

I am writing on the subject of software piracy. I agree that piracy harms the industry and is morally dubious, but there is not much that can be done.

My new Amiga 500 has drained almost all of my financial reserves, and the little money I have left I need for blank discs and programming books.

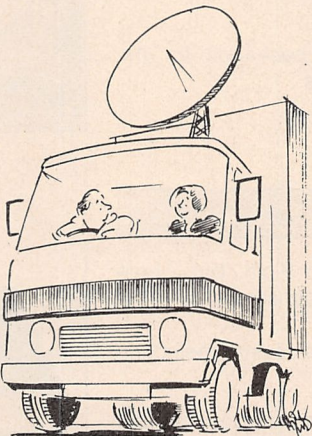
I simply cannot afford to buy software and I must depend on obtaining pirate copies.

However, while piracy damages the software industry, it is of great benefit to the computer industry as a whole. For example, I would not have been able to upgrade my C128 to the Amiga if all my money had gone

on software. Revenue lost to the software houses, but gained by Commodore, supporting hardware manufacturers and publishers of Amiga books and magazines. Many of my friends are in the same position.

Russell Wallace  
Co Dublin, Ireland

**(The views expressed in this letter are not necessarily those of the editor and staff of Popular Computing Weekly.)**



"Remember Alan Sugar saying his market was the truck driver and his wife?"

## A Spanish micro mystery

While walking down a back street in Malaga whilst on holiday, I came across an impressive window display in a small computer shop (which was closed).

The computer on show was a Philips NMS (New Media System) and I found the graphics demonstration quite amazing.

I'm writing to ask if you know anything about this machine and its capabilities (resolution, colours, memory, price, etc).

Lee Barton  
Runcorn

**Philips' NMS is the company's MSX 2 system. MSX is going well in Spain, hence the machine's presence. It is not scheduled for launch in the UK.**

## Disc drive compatibility

I have decided to upgrade from my Sinclair QL to either an Atari STFM or a Commodore Amiga.

On my QL I currently use the Microperipherals 3½ inch, one megabyte disc drive. Can you please tell me whether I will be

able to use it as a second drive on either the ST or Amiga? This will greatly influence my choice of machine to buy.

Also, as it is impossible to buy an Amiga emulator for the ST, is it possible to buy an ST emulator for the Amiga? If so, is there any point in buying an ST?

Dipak Devalia  
London NW9

**We spoke to Microperipherals' technical department about your disc drive. They tell us that using the drive with either an Atari ST or Amiga is possible, but not without some internal modifications being made to the drive.**

**They suggested that if you knew exactly what you were doing, a DIY job would be feasible; if not, then a knowledgeable electrical store might carry out the work. Microperipherals itself would not take such a conversion on.**

**An ST emulator for the Amiga is certainly physically possible, but we do not know of any currently being sold. One company, AIR, has publicised an emulator, but as far as we can ascertain, has been unable to produce the goods.**

## Properly addressed

I would be grateful if you could give a list of addresses of manufacturers responsible for the Amiga, Commodore, Amstrad, Spectrum, Archimedes, Compaq, BBC, IBM PC, Memotech and MSX computers.

Addresses of Casio and Sharp for their hand held computers and calculators would also be helpful if at all possible.

Evan M Fraser  
Glenrothes, Fife

**OK, here goes: Commodore UK (C64, C128, Amiga), Commodore House, Gardner Road, Maidenhead, Berks; Amstrad Consumer Electronics (Amstrad, Spectrum), 169 Kings Road, Brentwood, Essex; Acorn Computers (Archimedes, BBC), Cambridge Technopark, 645 Newmarket Road, Cambridge; Compaq, Ambassador House, Paradise Road, Richmond, Surrey; IBM UK, PO Box 6, Havant, Hants; Memotech Computers, Unit 24, Station Lane Industrial Estate, Witney, Oxon; Casio Electronics,**

**Unit 6, 1000 North Circular Road, London NW2; Sharp, Sharp House, Thorp Road, Newton Heath, Manchester M10.**

**There are around 10 to 12 companies which have produced MSX computers over the last three years and we haven't the space to list them all.**

**However, one of them, Sanyo Marubeni UK, is at 8 Greycaine Road, Greycaine Estate, Watford, Herts; and another, JVC, at JVC House, 12 Priestley Way, Eldonwall Trading Estate, London NW2.**

## All chess moves wanted

**R**e Chess Board, August 14. As a keen player who is also interested in chess computer programs I have been a regular reader of Martin Bryant's contributions.

I tried to play through the game between the Elite Avant Garde vs IGM John Van der Wiel, but, unfortunately, there appeared to be some omissions, eg, move 28, as well as a lack of distinction between actual moves played and those suggested.

Would it be possible to produce a listing of the actual moves made?

David Egdoll  
Glasgow

**It would.**

**White: John Van der Wiel  
Black: Elite Avant Garde**

- 1) c4 c5
- 2) Nf3 Nf6
- 3) g3 b6
- 4) Bg2 Bb7
- 5) Nc3 Nc6
- 6) 0-0 Nd4
- 7) e3 Nxf3+
- 8) Bxf3 Bxf3
- 9) Qxf3 e5
- 10) d3 Be7
- 11) e4 0-0
- 12) Bg5 d6
- 13) Bxf6 Bxf6
- 14) Nd5 Bg5
- 15) Qg4 h6
- 16) f4 exf4
- 17) gxf4 Bf6
- 18) Rab1 Bd4+
- 19) Kh1 Rb8
- 20) Rf3 b5
- 21) b3 bxc4
- 22) dxc4 Re8
- 23) Re1 Qa5
- 24) Re2 Qa3
- 25) h4 Qc1+
- 26) Kh2 Rxe4
- 27) Rxe4 Qc2+
- 28) Kh3 Qxe4



29) f5 Qe1  
 30) f6 Qh1  
 31) Kg3 Be5+  
 32) Kf2 g6  
 33) Qh3 Qb1  
 34) a4 Bd4+  
 35) Kg3 Rxb3  
 36) Rxb3 Qxb3+  
 37) Kh2 be5+  
 38) Kg2 Qxc4  
 39) Qc8+ Kh7  
 40) Ne7 Qe2+  
 41) Kg1 Bd4+  
 42) Kh1 Qf1+  
 43) Kh2 Be5 mate

### Quirk of the furniture

I too am suffering from the same Memotech problems as M J Burrows (Peek & Poke, August 21).

It's akin to buying a set of dining chairs with one leg shorter than the others and being told that it's just a quirk of the furniture – "when lunch is programmed you'll have to put four of our housebricks under the short legs; this may or may not work".

Surely, offering for sale any product implies that it will perform to specification, in this case the manual, which it does not.

I look forward to possible rectification tips from your readers.

K Dawson  
 Spalding, Lincs

### A friendly squeeze

Regarding "Memotech Letter Missing", from M J Burrows, Peek and Poke, August 21.

I have owned a Memotech MTX 512 since 1984, and have had many hours of pleasure using it.

The problem quoted is, in fact, well known to old MTX users.

The answer given is the way I cured the problem, or, I should say, a friendly TV man adjusted the horizontal hold inside the TV set, squeezing the picture in a bit, with no ill effects (I rented a set at the time, and the set has been with me ever since).

During adjustment, care must be taken to avoid the voltages that lurk inside television sets.

The address of Memotech Owners Club is, in fact, Phil Eyres, 13 Copse Road, Townhill Park, Southampton, as quoted in an earlier Letters page.

Orion Software (formally Syntaxsoft) runs another Memotech User Group, with a monthly magazine, *Memopad*. Its address is The Northbridge Centre, Elm Street, Burnley, Lancs BB10 1PD. This user group was started by Keith Hook some years ago.

Over the years both these user groups have been a positive lifeline to me, since information from other sources has been very scarce.

B Hibbert  
 Stockport

### Supporting Archimedes

A lot has already been said about the Archimedes. However, I feel I must express a pro-Acorn view amid all of the condemnation, emanating mostly from the Atari and Commodore sectors. There are a number of points in N Ellerby's letter (*Popular*, August 21) which I would like to clear up.

Contrary to his belief, the Archimedes is not beyond the home user's budget, nor schools, which may see the Archimedes as an investment – technology which should last well into the 1990s.

In his letter, he also stated that RISC machines are very hard to program at low levels – this is completely false. I have been working with a RISC assembler for some time now and can honestly say that it is much easier to use than, say, Z80 or even 68000 code.

Acorn has lost out for some time by still producing revamped 8-bit machines when other manufacturers have moved on to 16-bit machines.

Now Acorn has gone one step beyond and produced a machine to top the lot. Too many ST and Amiga owners have dismissed the Archimedes as "no competition" – so my own personal plea is: will everyone please give it a chance, and it will prove it is a world-beater.

As to my Archimedes itself, I feel if I fork out £1,200 for a computer, could Acorn not have tried out a few different keyboards before opting for the "Spectrum" feel.

Michael Spalter  
 London NW7

### Sponsors please

I am writing to you to enquire whether any of your manufac-

turers, retailers or supplier readers would be interested in sponsoring me in running a Bulletin Board system to advertise their products and services. I know a sufficient amount about IBM PC's and compatibles to be able to offer technical support for hardware and software.

If any company would like to get in touch with me could they contact me by one of the following: Richard Anthony Clifton, 3 Wykebeck Mount, Osmondthorpe, Leeds LS9 0HN, telephone: 0532 483597 (6pm onwards), or 0532 759741 (9am-4.30pm), or Prestel 532483597.

Richard Clifton  
 Leeds

### Civilisation discovered

I would be very grateful if you would print this letter, so that I can inform the world of a new Play By Mail game to be launched on Monday September 7th 1987 called "Civilisations", which contains some elements that are believed to be unique in the field of PBM gaming.

For a player's start-up fee of a cool fiver and a subsequent 75p per game move you can make use of many services and interact with all the players in the game – at least when you meet them. There is even going to be a game magazine available soon after launch.

I'll tell you one interesting feature just to get you interested – a legal system within the game that can be used by all players as well as the police force (game, of course!). The idea opens up unlimited scope for a PBM game.

For a start-up pack or information write to Anthony White, Adventure Plus Enterprises, 11 Shrewsbury Road, London N11 2LL.

Anthony White  
 London N11

We're sorry but *Popular Computing Weekly* cannot guarantee to reply to all letters requesting a personal answer. It helps us enormously if readers are prepared to have general queries answered on these pages, so, if possible, please do not send SAEs.

## Game One –honest!

Govelling apologies are in order this week, to anyone who has been valiantly trying to follow Game One in the chess tournament, only to discover that we've been intent on publishing the same set of moves for Game Two over and over again (well, twice).

It's all down to the weather and the pressures of living in the post Big Bang society.

Anyway, here, at last, is the readers' move 24, and *Colossus*'s reply. The readers rejoined the attack, causing *Colossus* to defend by bringing its rook to el.

### Your vote counts

Which move do you think would keep the pressure on *Colossus*?

Send your suggested next move to either Inter-Mediate (Popular Chess), Freepost, Sawbridgeworth, Herts CM21 9YA (no stamp needed), or Popular Chess, Unit 2, The Maltings, Sawbridgeworth, Herts CM21 0PG (with a stamp).

Only one vote per person please, and all entries must reach either address by Wednesday, September 9.

The move which gets the most votes will be entered into the game. Results and *Colossus*'s response will be published in two weeks' time.

Next week, we return to Game Two, where the readers are playing white.

### Game One

The moves so far:

- |                 |              |
|-----------------|--------------|
| 1 Pe2-e4        | Pc7-c5       |
| 2 Ng1-f3        | Nb8-c6       |
| 3 Bf1-c4        | Ng8-f6       |
| 4 Nf3-g5        | Pd7-d5       |
| 5 Pe4xd5        | Nc6-a5       |
| 6 Bc4-b5+       | Pc7-c6       |
| 7 Pd5xc6        | Pb7xc6       |
| 8 Bb5-e2        | Ph7-h6       |
| 9 Ng5-f3        | Pe5-e4       |
| 10 Nf3-e5       | Bf8-d6       |
| 11 Pd2-d4       | Pe4-d3       |
|                 | (en passant) |
| 12 Ne5xd3       | Qd8-c7       |
| 13 Nb1-c3       | Ke8-g8 o-o   |
| 14 Pf2-f4       | Qc7-b6       |
| 15 Nc3-a4       | Qb6-d4       |
| 16 Pc2-c3       | Qd4-d5       |
| 17 Ke1-g1 (o-o) | Rf8-e8       |
| 18 Be2-f3       | Qd5-b5       |
| 19 Pb2-b3       | Bc8-f5       |
| 20 Pc3-c4       | Qb5-b7       |
| 21 Pc4-c5       | Bd6-c7       |
| 22 Pg2-g4       | Bf5xd3       |
| 23 Qd1xd3       | Ra8-d8       |
| 24 Qd3xc3       | Qb7-b5       |
| 25 Rf1-e1       | ?            |



# Now Amiga 500 is set for price reduction

INDUSTRY speculation was rife last week about possible price changes for the Commodore Amiga A500, with some move almost certain between now and Christmas. A new price as low as £299 plus VAT, has been predicted.

Tradition in the micro industry would suggest that an extension of the current voucher promotion, offering £100 off the A500 or 1081 monitor or £200 off the pair to existing Commodore owners, is the most likely move.

The net effect of this promotion is to cut the A500 price tag to £399 plus VAT, and if the promotion is a success, it is likely that the offer will extend until Christmas.

Commodore UK was last week denying any talk of adjusting the price, or extending the offer, which is due to close on September 12th.

"We have no plans to do anything with the price of the A500," said Commodore UK Consumer Division sales manager Tom Hart last week.

"Nor are there any plans to extend the offer - it will end on 12th September."

But the signs are that the promotion is so successful that it would be surprising if it wasn't extended. Amiga distributor Zappo Computers' chairman Don Carter has been staggered by the effect of the promotion.

"A500 sales are currently



Tom Hart: no plans yet

phenomenal. The Amiga has moved from being a product that was important to us, but

frankly didn't sell very fast, to being a product that is currently our fastest-selling computer," he said.

This contrasts with the position in Germany, where it appears that poor sales have given rise to unofficial, or "grey" imports to the UK (see *Popular Computing Weekly*, August 28 and *News Analysis*, this week). Sources have suggested that German operators may press for a similar promotion there, and this too would point to a UK extension.

Looking to the future, some observers are also convinced that current events would make a permanent price cut after Christmas inevitable.

## Konix Speed King wobble winner

KONIX has claimed responsibility for this picture, and says it shows the lucky winner of its



Speed King Joystick Wobble competition, Maris Geert of Belgium.

Maris won £100 for guessing that the Speed King would last 643 hours - or 26 days, 19 hours - of continuous wobbling. The correct figure was 652 hours, or 27 days, four hours. At a rate of 450 wpm (wobbles per minute, of course), the test involved a total of 17,604,000 wobbles.

"I had heard how durable the Speed King is, and so I worked out how long decent joysticks should last when playing *Daley Thompson's Decathlon*, doubled it - et voila!" said Geert.

## PCW decision aid

THE first expert system for the Amstrad PCWs made its debut last week. *Second Opinion* is more accurately described as a decision aid, according to publisher HeptaCon.

The menu-driven product is primarily aimed at the personnel and management consultancy markets.

But HeptaCon makes it clear

## Sparks flying after CSD's Maynard deal

A DISPUTE has arisen over the rights to a number of games on the Sparklers label, formerly owned by the distribution house CSD, which is now in receivership.

A deal was signed on August 21 assigning rights to the Sparklers range to Maynard International (see *Popular Computing Weekly*, August 28). Since then,

Bob Brenchley of Nationsoft has argued that the rights to eight of its titles, which were licensed to CSD, have now reverted back to Nationsoft.

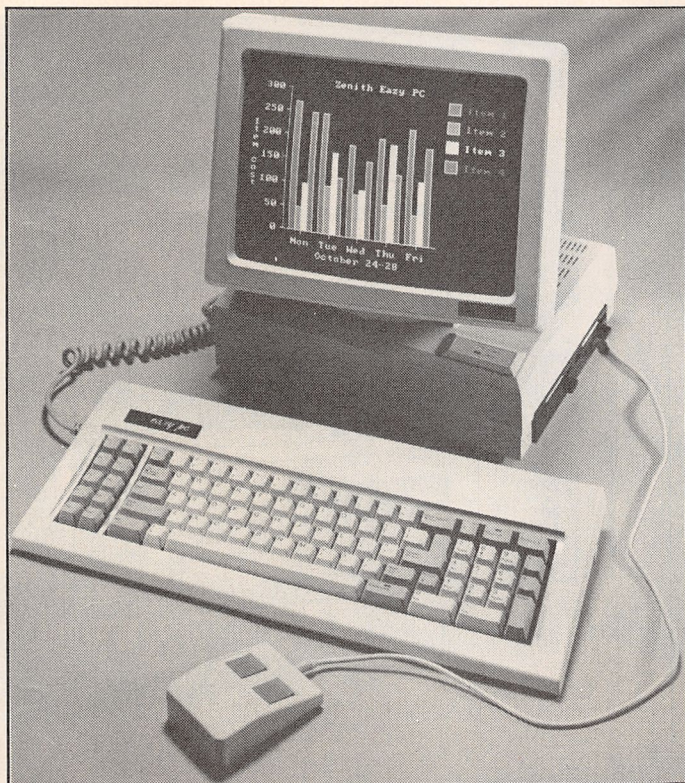
Brenchley has claimed in the trade press that "the titles reverted back to us if they weren't marketed within 18 months, they ceased to market the program, or if the licensee ceases to trade or enters into liquidation."

Maynard International has denied that this is the case and Nigel Ruddock, of receivers Robson Rhodes, has had little contact with Brenchley.

"We're not sure what the essence of his claim is," Ruddock told *Popular Computing Weekly*. "So we're not in a position to comment. It's up to him to press his claim with us."



# New heights for Zenith with cheap PC clone launch



ZENITH has taken steps to strengthen its position in the crowded PC clone market with last week's launch of the Eazy PC, which starts at £587 inclusive.

The move is a clear attempt to knock Amstrad's PC1640 on the head in its attack on the vast corporate market, but is also aimed at home and educational markets. Delivery starts later this month.

"Zenith looks as though it's in direct competition with the 1640," said Ruth Keatch of analyst Phillips and Drew. "And the Amstrad seems to offer no advantage whatsoever."

In specification terms, the Eazy PCs are something of a PC1512 and a half competitor. All three Eazy models have 512K Ram expandable to 640K, keyboard, MS-DOS 3.2, MS-DOS Manager (Zenith's propri-

etary user interface), parallel port and, on hard disc models, a mouse as standard. All models come with a 14 inch black-on-white CGA mono monitor.

The entry-level Model 1 has one 720K 3½ inch floppy disc drive, price £587 inclusive; Model 2 has two 720K 3½ inch floppies, price £705 inclusive; and Model 3 has a 20Mb hard disc drive and one 3½ inch floppy drive, price £1057 inclusive.

Zenith is keen to point out the Eazy's compatibility with existing and future competitors – especially IBM's Personal System 2.

"The Eazy PC is an entry level system for serious professional and corporate users with consistent upgrade to Microsoft Windows 2, Windows 386, OS/2 and SAA," said Zenith UK managing director Clive Taylor.

## SOFTWARE HOTLINES

Once more we all peer into the murky pre-PCW void to see if there's any signs of life, and come up wondering why we bothered. It's worth mentioning, though, that while there's a relative lack of new games down at the 8-bit end of the market, 16-bit software is becoming noticeably more abundant.

Most of **Rainbird's** releases these days are originated on 16-bit machines and converted downwards. That includes its next **Level 9** trilogy for the ST, *Time* and *Magik* (pictured below).

This brings together updated versions of *Lords of Time*, *Red Moon* and *The Price of Magik*, with new graphics and the sophisticated parser that it's used in their last few games.

I've just finished reviewing **Microprose's** *Moebius*, and straight away there's news of even more kung-fu games.

**Gremlin** has put the finishing touches to *Samurai Trilogy*. The trilogy bit refers to the three modes of combat that you have to endure in order to complete the game: Karate, Samurai and Kendo.

It's a bit more complicated than some martial arts games, as there are also three training routines which you can concentrate on, honing various abilities depending on your judgement of your opponent's strengths and weaknesses.

**Activision** is also joining the fray with *International Karate II*, the follow up to System 3's recent hit. This time, though,

they've given you a second opponent so that you can play against the computer and another player at the same time.

To cope with all this extra action you've got some flash new moves that you can perform, including a nice line in backflips and doing the splits in mid-air so that you can kick both opponents in the head at once (that's my kind of game!).

The Spectrum version of *Samurai* should be in the shops any day now, while *IKII* is due on the C64 in a month or so.

**Firebird** is finishing off *Scary Monsters*, featuring a character called Norma Slama (there's a smutty pun there, but I haven't worked it out yet). Norma's been kidnapped by some mad loon and imprisoned on an island that's full of evil spirits.

*Scary Monsters* has a fast loading routine even on the disc version – look out for a review soon.

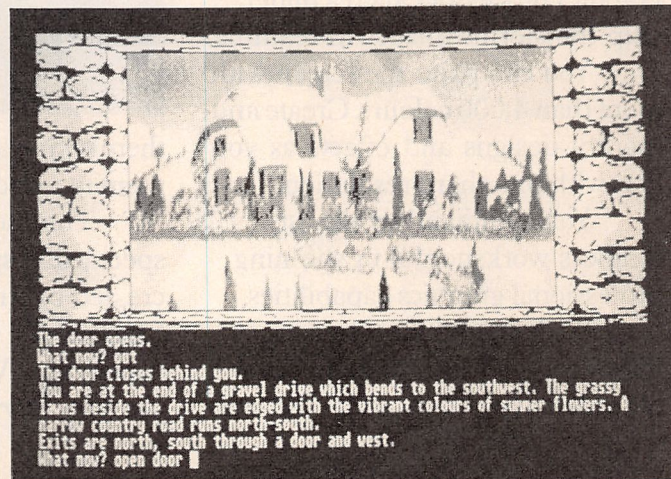
I don't know if there's anyone there who's actually got an Archimedes yet, but **Superior Software** has already got *Zarch* lined up – the first third party Archimedes game that I've heard of.

Superior has produced some of the best games for the BBC machines in the past and it's making great claims for *Zarch*, but, of course, you won't be able to see it until – guess when – the PCW show.

And, speaking of That Show, one year after its first public appearance, *Star Trek* will be beaming down to the show again this year. Ah, but is it finished? A voice from Firebird says, "all we can promise is that *Star Trek* will be previewed at the show."

Oh well, la plus ça change and all that. Beam me up, Scotty.

**Cliff Joseph**



More news on page 10



# NEW AM NOW OTHER HOME COM

Amiga 500 is here.

With a mind-blowing array of features and capabilities.

And a £499<sup>‡</sup> price ticket (ex VAT), hundreds of pounds less than anyone could have predicted.

"...a miracle of compression..." writes *Popular Computing Weekly*\* "...it all adds up to a formidable system which is clearly better than anything else at the price."

This elegant little machine takes family computing into new dimensions of creativity, excitement and productivity.

It outruns and outguns office PCs as a business multi-tasker, performing a deskful of different jobs simultaneously, at over 7 million steps per second in realtime.

So other home computers may not be the only machines it consigns to the toy cupboard.

## AMAZING SCIENCE FACT!

Amiga is used by Disney, Universal and other Hollywood studios for its dazzling 3D graphics manipulation and animation powers.

A sophisticated high-speed graphics processor called a blitter chip transforms images in realtime.

You can paint the screen with more than 4,000 colours. Create and modify designs and effects as you like, with pin-sharp resolution.

You command an almost limitless workshopful of stunning professional graphics capabilities.

With an optional Genlock interface, you can capture images off videotape. Manipulate and mix



them with graphics. Then re-transfer them to videotape!

This means you can produce spectacular special effects like those created by Amiga computers for Channel 4's *Chart Show* and the American TV science fiction series *Amazing Stories*.

## YOU AIN'T HEARD NOTHING YET!

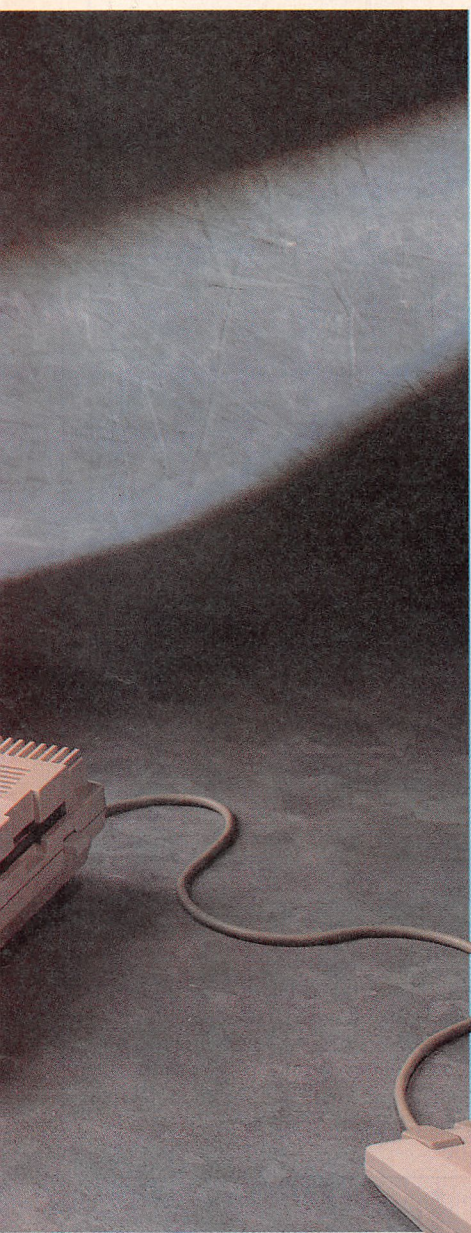
Concealed within the sleek Amiga shape, there is also a pro-quality sound synthesiser and four-track stereo sound system.

Driven by another powerful and unique custom chip, it can synthesise musical instruments and

<sup>‡</sup>Includes DeluxePaint from Electronic Arts worth £79 + VAT! (Excludes monitor or TV modulator.)



# IGA 500. PUTERS ARE JUST TOYS.



Your Amiga can also synthesise the human voice.

It can speak back anything you care to write on the keyboard.

So this is one computer that can not only word process with faultless professionalism, and incorporate superlative graphics into the text, it can also read the text back to you aloud.

## **GAMESMANSHIP AND WORKMANSHIP!**

The new Amiga 500, in fact, dumbfounds its competitors in every way.

Graphics, stereo sound, multi windowing, multi screens, 512K to 1Mb RAM (expandable by an incredible 8 further megabytes externally\*\*), 3½" internal disk drive with 880K of mass memory, 4 unique dedicated chips plus the 16/32-bit power and 7.14MHz speed of its central processor, communications and vast expansion potential all add up to a computer of immense professional capability.

Yet the same technology allows the Amiga 500 to play games so mind bending that only full-scale arcade machines

have been able to play them until now.

## **AND AMIGA MEANS 'FRIEND'!**

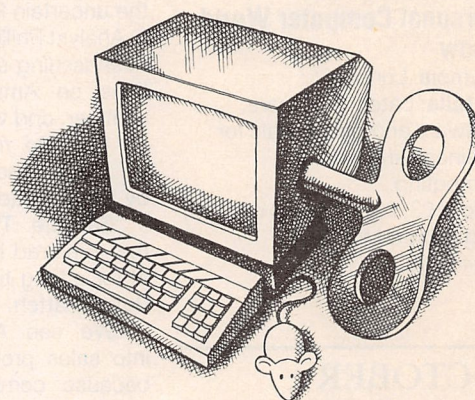
However many of the Amiga's extraordinary talents you find yourself using, they will all be beautifully simple and natural.

You will be totally at home in the friendly and effortless Amiga

environment, where everything happens by windows, icons, mouse and pulldown menus.

And the Amiga 500 simplifies life in another way too.

There is now no comparable home computer. At any price.



Try the astonishing new Amiga 500 at your nearest Commodore Amiga dealer.

And discover why *Personal Computer World*†, having tested the graphics performance of Amiga's latest and most powerful rival, concluded "...Amiga still reigns supreme..."



# Commodore

sound effects.

An optional digitiser allows you to take onboard real sounds. Mix and modify the two. Translate your compositions from keyboard to sheet music. Play them back through the monitor's speaker or your hi-fi.

\*Popular Computing Weekly, 22-28 May 1987. †Personal Computer World, February 1987. \*\*Subject to availability.

AMIGA IS A TRADEMARK OF COMMODORE-AMIGA INC. © 1987 COMMODORE BUSINESS MACHINES (UK) LTD. ALL RIGHTS RESERVED.



## DIARY DATES

### SEPTEMBER

12 September  
**North-West England Dragon Show & Convention**  
 Bishop Henshaw Upper School, Thornham, Rochdale  
**Details:** Software, demonstrations, clinic etc  
**Price:** £1.50, £1.00  
**Organiser:** Pulser Software (0706) 849189

23-27 September  
**Personal Computer World Show**  
 Olympia, London  
**Details:** Latest hardware, software and peripherals for business and leisure computing  
**Price:** £3, £2 - (parties over 10)  
**Organiser:** Montbuild 01-486 1951

### OCTOBER

15-17 October  
**Desktop Publishing Show**  
 Business Design Centre, London  
**Details:** Demonstrations of latest hardware and peripherals, plus seminars and user clinics  
**Organiser:** Database Exhibitions, 061-456 8383

### NOVEMBER

14 November  
**National Einstein Exhibition**  
 National Motorcycle Museum, Birmingham  
**Details:** Einstein software etc.  
**Price:** 50p  
**Organiser:** UKEUG (0473) 49507

Prices, dates and venues of shows can vary, and you are therefore strongly advised to check with the show organiser before attending. We cannot accept responsibility for any alterations to show arrangements.

# Amstrad gets shares lift by watching TV

AMSTRAD's share price reversed its downward trend last week at stories that the consumer electronics company is to go into partnership with a satellite broadcasting consortium next year.

Recent weeks have seen City confidence in Alan Sugar's company at a low ebb with some observers seeing trouble ahead in Amstrad's reliance on the uncertain PC market.

Analyst Phillips and Drew has been issuing sell recommendations on Amstrad shares all summer, and wasn't impressed by the 10p rise in the share price last Tuesday, prompted by the satellite news.

"Satellite TV is something that Amstrad has been looking at for a long time," said P&D's Ruth Keattch.

"We see Amstrad running into sales problems in '87/88, because computer sales are beginning to come under pressure.

"We would like to see the company diversifying into something now, and we were hoping that Amstrad would have announced a move into white goods. But it does appear to have missed opportunities," she added.

Amstrad itself cast some doubt on the satellite collaboration by issuing the following statement: "Amstrad is watching the market for satellite television reception, and if this market ever becomes popular resulting in high demand for



Alan Sugar: needs to diversify, say analysts

receiving equipment it is not unreasonable to assume Amstrad will have an extreme interest in becoming a major vendor."

Recommendations described as "more bullish" than those of

Phillips and Drew were being sent out last week by analysts at Barclays de Zoete Wedd and Chase, among others, and Amstrad shares continued to rise during the week.

# FAST joins police in illegal software swoop

DETECTIVES last week mounted a successful joint exercise with the Federation Against Software Theft to crack down on an illegal business software operation in Torquay.

Torquay CID announced that Gerhard Werner Martens, a German national, had been arrested and charged with one of

fence of forging a number of computer discs, and one of importing manuals illegally.

Martens was a director of TOS International, a company which had advertised extensively in the computer press. Detective Sergeant Edwards of Torquay CID said that a joint investigation with FAST had

been mounted after complaints had been received from a number of other companies.

D/S Edwards added that Martens might face further charges under the Copyright Act, including forgery and importing discs illegally.

Martens' next remand hearing is due this week.



# Infogrames aims to help Band Aid

## NEXT WEEK

INFOGRAMES' autumn release schedule features a game which is intended to raise money for Band Aid. It also includes a number of new versions of previous releases and new titles for the Amiga.

*Sidewalk* features a motorbike which is stolen on the way

to a Band Aid concert. The object is to recover motorbike, tickets and – naturally – the girlfriend, before she goes off with someone else.

Infogrames has made it clear that a minimum of 15p will be donated to Band Aid from the proceeds of each copy of *Sidewalk*.

*Sidewalk* will be available later this month for Atari ST (£19.95), PC (£24.95), Amstrad CPC (£9.95 and £14.95).

This month also sees the sequel to *Passengers on the Wind*. *Passengers on the Wind II* will be available on Atari ST (£19.95), PC (£24.95), C64 (£12.95 and £14.95), Amstrad CPC (£12.95 and £14.95) and, in October, Commodore Amiga (£29.95).

Other titles scheduled include the latest in the crime series, *L'Affaire Vera Cruz* for the PC, and PC, ST and Amiga versions of *Three Musketeers*.

MSX owners will welcome the October release of *Camelot Warriors* and the Spanish-originated *Abu Simmel Profanation*, both price £9.95.

## Sound effects

Kenn Garroch continues his guide to computer sound chips and how to program them to create sound effects in your own routines.

## Archimedes on course for shops

ACORN'S Archimedes micros are starting to ship to dealers, and are on schedule to begin volume production and delivery during September.

"We have our dealer network and we have a number of retailers in the high street, who will

be getting machines around the middle of September," said Acorn's Stephanie Newman.

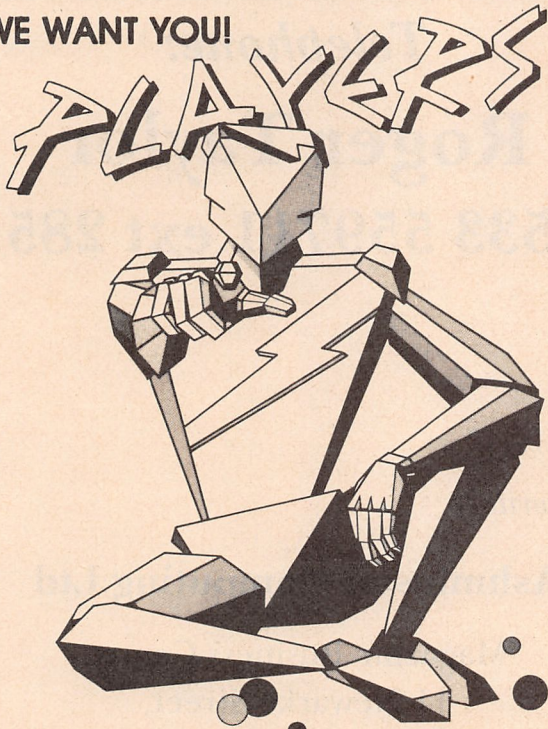
Doubts had been expressed whether Archimedes' operating system would be in Rom, or on disc. Acorn has confirmed that it will be in Rom.

## Max

AMS's MAX aims to give your Amstrad CPC that Macintosh look with a Wimp (window, icon, menu, pointer) desktop system for any CPC with a disc drive.

Duncan Evans puts Max through its paces, and reports on its performance.

WE WANT YOU!



THE PLAYERS TEAM ARE OUT LOOKING FOR YOU!

CAN YOU WRITE COMMERCIAL QUALITY GAMES IN MACHINE CODE?

Write in Strictest Confidence to:  
RICHARD PAUL JONES  
PLAYERS SOFTWARE, CALLEVA PARK  
ALDERMASTON  
BERKS. RG7 4QW

or phone: (07356) 77421 (5 lines)

## Aztech MicroSkil

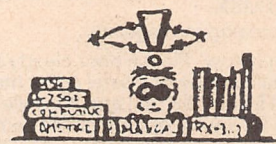
Training for

## AMSTRAD

## PCW's and PC's

Can't understand the manual?

Are they 'barmy' or is it me?



If you're a first time user on the Amstrad PCW series or the new PC, have a word with us and we can train you on how to use your new computer.

We can help you perform the fine arts of word processing, from basic to advanced levels or to gain a knowledge of computerised accounts.

If you are interested in any of these courses phone Colleen for more details.

**173 Basingstoke Road 0734 755768**

**Reading**

**Berks RG2 0HF**



# SPEEDYSOFT

The Fastest Mail Order Service Available

## Some very Special Introductory Offers for new members

Order up to a maximum of 5 titles for only £1 each

### Spectrum

River Rescue  
Alien Highway  
Stage Coach  
Tower of Evil  
Attack of the Killer Tomatoes  
Grumpy Grumphrey  
Supersleuth  
Automania  
Orc Attack  
Delta Wing  
Braxx Bluff 3D  
Backpacker's Guide to the Universe  
+ 80 VAT Manager  
Tapper  
Blockade Runner  
Special Delivery  
Kidnap  
Chopper  
St. Crippens  
Desert Burner  
Snodgits  
Chiller  
Space Walk  
Apollo 2  
Formula 1 Simulator  
Jason's Gem  
Journey's End  
Holy Grail  
Sinbad and the Golden Ship  
Rockman  
Soul of a Robot  
Space Hunter  
Inc. Shrinking Fireman  
Ticket to Ride  
Sky Ranger  
ZZZZZ  
Lap of the Gods  
Octagon Squad  
Kane  
Universal Hero  
Pippo  
Hyper Bowl  
Future Games  
Master Chess  
Milk Race  
Video Poker  
Bump, Set, Spike  
Colony  
Invasion  
Jackle & Wicle  
Gallitron  
Wolffan

### Commodore 64

P.C. Fuzz  
Master of the Lamps  
Commando  
Special Delivery  
Wing Commander  
Snodgits  
Everyone's a Wally  
Java Jim  
Beach Head  
Orc Attack  
Seaside Special  
Zaxxon  
F.A. Cup Football  
Frantic Freddie  
Jinn Genie  
Countdown to Meltdown  
River Rescue  
Eureka  
Caesar the Cat  
Herberts Dummy Run  
Confuzion  
Grog's Revenge  
1985  
One Man & His Droid  
ZZZZZ  
Nonterraqueous  
BMX Trials  
Space Hunter  
Chiller  
Se Ka of Assiah  
Vegas Jackpot  
BMX Racer  
Challenger  
Holy Grail  
Zonal Patrol  
Percy  
PSI Warrior  
Go for Gold  
Redhawk  
Back to the Future

### Amstrad

Meltdown  
Alien  
Beach Head  
Defend or Die  
World Cup '86  
Yie Ar Kung Fu  
Sweevo's World  
Exploding Fist  
Fantastic Voyage  
Superchess  
Equinox  
Boulder  
Sky Fox  
Confuzion  
Technical Ted  
Air Traffic Control  
Artwork  
Frank Bruno Boxing  
The Magic Sword  
Electro Freddie  
Splat  
Jet Boot Jack  
Roland Goes Digging  
Finders Keepers  
Chiller  
Nonterraqueous  
Locomotion  
Soul of a Robot  
One Man and His Droid  
Caves of Doom  
Kane  
Radzone  
Molecule Man  
Video Poker  
Feud  
Colony  
Jackle & Wicle  
Galletron  
Back to Reality  
Xcel  
Kentilla  
Kobyashi Naru  
Curse of Sherwood  
Rasterscan  
Chronos

- ★ Orders despatched within 48 hours.
- ★ We accept Access, Visa, Mastercard and Eurocard.
- ★ Orders accepted by telephone between 9.30am to 7.30pm – Monday to Saturday. Just telephone: 056 45 5975.
- ★ Free membership if you order any of the above titles.
- ★ Overseas orders are welcome.
- ★ We cater for Commodore 64, Spectrum, Amstrad CPC and PCW, Electron and MSX.
- ★ Members receive catalogues regularly.

To order just fill in below. Please print clearly and do not forget to enclose either cheque or postal order made payable to **Speedysoft**, 15 Lady Byron Lane, Knowle, Solihull, West Midlands B93 9AT or fill in credit card details.

Name ..... Comp Type .....

Address .....

Visa/Access/Mastercard/Eurocard

Card No.

Title	Price
1. ....	.....
2. ....	.....
3. ....	.....
4. ....	.....
5. ....	.....
Post & Packing	£1.00
Grand Total	.....

Please remember only up to a maximum of 5 titles

## Programmers

Experienced  
assembly language  
programmers  
required to work on  
conversions and  
original projects for top  
software houses.

Telephone:

**Roger Taylor**  
**0533 559711 ext 285**

Or write to:

**Ashminster Computing Ltd**

Magazine Business Centre  
11 Newarke Street,  
Leicester LE1 5SS



THE current revelations of unofficial imports of A500 Amigas raise the vexed question of consumer rights versus the computer industry.

There is nothing new about unofficial, or 'grey', imports in the computer or similar industries. Only 18 months or so ago, there was a flurry of panic, as the threat of Spectrums bought in en masse from Brazil loomed.

But this situation puts a rather different slant on things. Commodore is a truly multinational corporation, with dealers all across the USA, Europe and Japan.

Suddenly, reports of "dodgy" computers being sold by dealers start to come in. Commodore warns people against buying them, naturally enough, and vows to catch up with

of pounds down on the deal. This situation is to say the least unfortunate. Firstly the fact that there are still differing electrical standards between EEC member countries is astounding.

And why is Commodore not able to offer the customer any more than advice?

Commodore UK boss Steve Franklin has recently said three salient things regarding the matter.

## Unofficial imports

He advised customers to be careful. He has said it is impossible to stamp out unofficial imports of any manufactured goods. And finally he said that the customer is the most important party, the one who must be protected.



The Amiga 500: "grey" versions have been on sale to unwary customers

# IMPORTING IN SHADES OF GREY

John Brissenden addresses the question of Commodore's inaction over the unofficially imported Amiga 500s

those responsible. Are they forgeries, knocked together in a disused warehouse, filled with cardboard?

Well, no. Actually they are perfectly legitimate Commodore machines which dealers, distributors or other persons unknown in Europe have off-loaded at bargain-basement prices onto the UK market.

## Malfunction

The problem is that they conform to European specification and standards, ie, have round-pin plugs and run on a 220V power supply. They have been supplied with bogus UK warranty cards as well. If, as is likely, they malfunction when used in the UK, the hapless customer is at the mercy of the dealer who bought them in the first place.

If the dealer bought them unwittingly, then that customer is landed with a stupid dealer.

But what if the dealer knew all along? Then the customer is up against an unscrupulous operator, and may end up hundreds

of pounds down on the deal. This situation is to say the least unfortunate. Firstly the fact that there are still differing electrical standards between EEC member countries is astounding.

And why is Commodore not able to offer the customer any more than advice? Commodore UK boss Steve Franklin has recently said three salient things regarding the matter.

He advised customers to be careful. He has said it is impossible to stamp out unofficial imports of any manufactured goods. And finally he said that the customer is the most important party, the one who must be protected.

Clearly the reality is rather more complicated. Don Carter is chairman of Zappo Computers, the UK's largest Commodore distributor, and he sums up Commodore's position. "I think Commodore are in a very difficult position. Under the Treaty of Rome we are in a free market, so there's no reason why products shouldn't be imported into this country from Europe. Commodore would stand in contravention of the Treaty if it tried to stop those imports," he says.

That explains why the company hasn't taken stronger ac-

tion, despite making a great deal of noise about the affair. So why is Commodore so anxious to draw people's attention to it, apart from "protecting the customer"?

"Obviously Commodore aren't thrilled that someone in Europe is screwing up their market, but on the other hand have a duty to warn people that these products are not UK products. The technical subtlety is of significance," Carter continued.

"These products coming in from Europe have not been through UK quality control, or the retailer's or distributor's quality control. So there is every possibility that they will be more prone to failure. I don't think Commodore can do any more, to be honest."

Now there is a twist to this. Franklin is genuine when he speaks of protecting the customer, but some have expressed the view that the recent fuss has been sour grapes on Commodore UK's part, an-

noyance at the way that certain parties have conspired to take sales away from them.

Not only that, but the grey imports affair has, in Carter's view, ultimately helped the customer by forcing Commodore UK to compete with the price of the 'unofficial' Amigas.

"In the early days, the Amiga didn't sell well Europe-wide. All the companies had targets to achieve, and some dealers and distributors tried to engineer prices which resulted in the machines coming in at silly prices," he says.

"Commodore UK put a stop to it, and the only reason that the grey imports have ceased is that the promotion that Commodore UK is offering is better than the price of the grey imports. Grey imports prosper when there is a market for them," Carter adds.

So there it is. Grey imports cut both ways, and if the spending power of the ordinary consumer is strong enough, it is the buyer who wins.



# The powers of

High quality printed output doesn't necessarily mean splashing out on a daisywheel or waiting for laser prices to drop. Tony Kendle and Chris Jenkins look at the features offered by 24-pin dot matrix printers.

Standard dot matrix printers use (on the whole) a 9-pin vertical print head to ink in each printed letter as a combination of dots. Increase that head to 24 pins and your print resolution nears true letter quality without sacrificing any of the speed of the lower specification models.

Inevitably, 24-pin printers cost a fair bit more, but if you shop around you'll find they needn't break the bank.

## NEC P6

As 24-pin printers go, the NEC P6 is rather long in the tooth. This does not mean that there is anything wrong with it, it is a superb machine, but rather that it is relatively well supported by software and often available at a discount price. Although the list price from NEC is over £500, it can commonly be picked up for around £380 and makes an irresistible entry level 24-pin machine.

The P6 has an automatic single sheet feed-through mechanism which works well but there is no inbuilt tractor feed (at dealer rather than NEC list prices it costs about £30 to add a simple one, £120 for a bi-directional tractor). A proper sheet feeder option exists (about £160) which worked well for the whole of the test period – at times it is a bit slow because it really goes to town on feeding the old paper out. However, it is reliable, doesn't jam as long as you use the recommended paper weights, and can be left alone for an entire print run without worry.

You do not have the option to use plug in fonts on the P6/P7 models unless you first invest in a (dealer fitted) add-on memory board. This gives you a 32K buffer and the option of adding font chips which cost only about £10 and include fascinating options such as a bar code print style. The P5 and P9 ranges allow plug-in font cartridges and other niceties such as dual bin sheet feeders but are very much more expensive.

The P6 is extremely quiet in normal operation, one of its strongest points, and has a special button on the front panel which makes it even quieter at the expense of some print speed.

The other front panel options are very good for controlling pitch and quality but not much else. One nice touch is that, if you wish, these choices can override any at-

tempts by your software to reset the printer.

The internal font is superb in letter quality (72 cps). There is also a 'high quality draft' mode and a 'fast draft' (216 cps). All of the options you could wish for mixing and matching print styles, such as bold, italic, enlarged letter quality, are supported and look excellent.

The dip switches are fiddly to get at, and nearly as inaccessible as on the Star NB 24-10 (see below), but thankfully all options are also software selectable, including the change to the IBM character set. Notable unusual features include double height and double or triple width printing, any of which options can be mixed at will. There is an 8K

dots per inch. Colour version of the P6 and the wide carriage machine, the P7, sell for about £100 more.

**Printer NEC P6 Price £380 Supplier**  
NEC, 35 Oval Road, London NW1 7EA.

Coming in at around the £500 mark the Star NB 24-10 sets some important standards of excellence.

Star has reached new heights with its front panel control buttons. Almost everything you could wish for: page length (but, of course, no support for continuous A4),

## Star NB 24-10

print quality, print pitch and font, can be chosen at the press of a button. The price you pay is that the remaining dip switches are deeply hidden within the recesses of the machine and only accessible by removing the ribbon.

This is unfortunate as one is very important – the IBM character set selector which appears to have no equivalent front panel or software control.

Almost every other feature you can imagine is also software selectable. Notable unusual options include double height double width, quadruple height quadruple width, overlining as well as underlining and a single character type mode which prints every character as it is sent (ie, without placing it in the buffer) and rotates the platen each time to make the print visible – like the old *World of Sport* telex machine.

The paper load controls are also excellent. There is an inbuilt bidirectional tractor which is based on a 'paper-saving' push feed system but works extremely well with no sign of any jamming. Alternatively you can use the single sheet feed-through mechanism which makes the use of A4 or headed paper easier.

An optional extra is a very competitively priced sheet feeder which remains untested, as the review machine was supplied with the model for the wide carriage NB24-15.

The print quality is superb. In draft mode it looks almost as good as the Amstrad PCW is in NLQ. The letter quality mode passes the closest inspection, and this quality is preserved across a range of print styles – bold, italic, super- and sub-script.

This is the normal type

This is the Elite font.

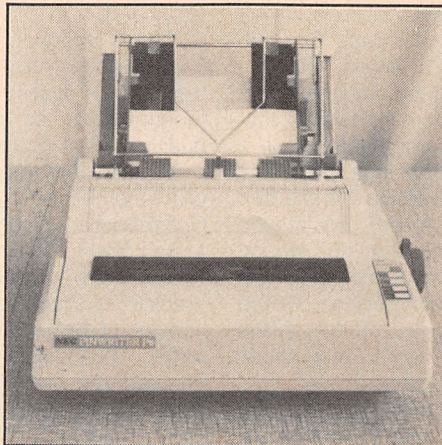
*Italics too!*

**Boldface**

buffer as standard, and 120 characters can be downloaded. Letter quality characters can fit on a matrix of up to 24 dots high by 37 dots wide.

The machine is optionally Epson LQ 1500 and IBM Proprinter compatible. It is capable of graphics resolution of up to 360 × 360

NEC P6



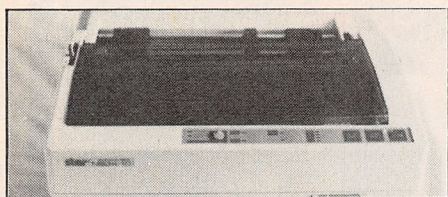


# 24-pin printers

These in turn can be mixed with each other, in pica, elite or condensed pitch and so on, in all there are 255 possible combinations.

Optional extras include font cartridges that plug in to a slot on the front of the machine (there are two slots on the 15 inch model). They include an ORATOR font which is made up entirely of capital letters, but with true capitals larger than the others, and Letter Gothic which was my favourite.

Print speeds are quoted as 216 cps draft, 72 cps letter quality.



Star NB 24-10

Up to 35 draft or letter quality downloadable characters can be remembered at once. The buffer size is 8K.

Graphics are capable of a resolution of up to 240 x 240 dots per inch, although few programs take advantage of this. The machine is optionally Epson LQ-1500. IBM Proprinter and IBM Graphics printer compatible.

Finally a superb manual helps, with Basic programs to demonstrate almost every feature.

This is the standard font.

ABCDEFGHIJKLMNOPQRSTUVWXYZ  
abcdefghijklmnopqrstuvwxyz

THIS IS THE ORATOR FONT.

ABCDEFGHIJKLMNOPQRSTUVWXYZ  
ABCDEFGHIJKLMNOPQRSTUVWXYZ

This is the courier font.

ABCDEFGHIJKLMNOPQRSTUVWXYZ  
abcdefghijklmnopqrstuvwxyz

This is the letter gothic font

ABCDEFGHIJKLMNOPQRSTUVWXYZ  
abcdefghijklmnopqrstuvwxyz

**Printer** Star NB 24-10 **Price** £499  
**Supplier** Star Micronics, Craven House, 40 Uxbridge Road, London W5.

Citizen's HQP-45 is a big beast, which can deliver fine quality printouts if you can cope with its little foibles, and indeed its sheer physical size. Organise plenty of desk space if you hope to take on this 118 x 593 x 358mm monster, which weighs in at 7.5kg.

The HQP-45 features a 24-pin head and built-in compatibility with Epson's 24-pin machine, the LQ1000. Indeed, the HQP-45

## Citizen HQP-45

uses the LQ1000's ribbons, which are easily obtainable.

There are three print modes, selected with a button of the front face; draft (200cps), correspondence (132cps) and letter quality (66cps), the last of which produces such good output that it could easily be mistaken for the product of a daisywheel. Proportional spacing can also be selected for any mode.

The resident font is Courier 10, but again this can be altered with optional font cards. These are selected from another switch on the front of the printer; also found there are the line feed/form feed and on line/off line toggle switches.

As you would expect from a device of this quality, a variable width tractor feed is built

in. Although I found that this tends to stick unless you have the knack of pushing it at just the right angle, once set it's no trouble, and will cope with perforated paper up to fifteen inches wide. The HQP-45 also takes single sheets if you slide the selector on the left of the platen to FRICTION FEED.

The HQP-45 features a serial RS-232 socket on the right hand side, and parallel Centronics connector on the back. Apart from that it's remarkably free of extraneous doohickies; all the other functions are set from an array of 32 DIP switches hidden under a cover beneath the front panel.

I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	[	]	^	`	~	abc
J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	[	]	^	`	~	abcd	
K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	[	]	^	`	~	abcde		
L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	[	]	^	`	~	abcdef			
M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	[	]	^	`	~	abcdefg				
N	O	P	Q	R	S	T	U	V	W	X	Y	Z	[	]	^	`	~	abcdefgh					
O	P	Q	R	S	T	U	V	W	X	Y	Z	[	]	^	`	~	abcdefghi						
P	Q	R	S	T	U	V	W	X	Y	Z	[	]	^	`	~	abcdefghij							
Q	R	S	T	U	V	W	X	Y	Z	[	]	^	`	~	abcdefghijk								

The range of functions available is almost too long to go into. You can choose the default print mode and default font (in-built or on card), set print pitch to Pica or Elite sizes, and set a number of international characters. American, British, German, French, Italian, Spanish, Swedish and Danish sets are available.

Line spacing can be set to six or eight lines per inch, and paper length to 11 or 12 inches. The paper out detector can be enabled or disabled, and an optional automatic cut sheet feeder can be activated.

The interface type and serial interface parameters, automatic carriage return and bidirectionality can also be set with the DIP switches.

While the speed, quality and range of function of the HQP-45 are exemplary, I found it a bit of a pain to actually load up. You have to lift the main cover and actually remove the paper cutter to get at the paper bail, which otherwise catches on the paper when the semi-automatic loader catches the paper and snatches it out of your hands.

The ring-bound manual does a good job of explaining Ascii codes, software control, interfacing and using the DIP switches. I have been using the HQP-45 for word-processing using an Atari 1040 ST and *First Word Plus*, and apart from the minor niggle about the fiddly loading system, have been very pleased with the printer's speed, quality and versatility.

Chris Jenkins

## Juki 7200

In certain areas, laser printers have a long way to go to catch up on established printing technology. One of their major limitations is that, because of their similarity to photocopiers, the paper has to be of appropriate size and type to fit on the toner drum. This is insurmountable without a fundamental revision of the operating design. Even though memory prices are dropping the best we can hope for is A3 size machines.

The new 24-pin machine from Juki, the 7200, costs little less than a laser printer but incorporates some important innovations that will help dot-matrix machines to hang on in there in the DTP market.

Most notably it has no platen and uses a flat bed system where the paper lays face up, and the printer head moves over it. As well as paper of any thickness it is even possible to insert card to produce high quality printed signs, calling cards, packaging and so on. It could be a taste of the things to come.

**Printer** Juki 7200 **Supplier** Micro-Peripherals, Intec Unit 3, Hassocks Wood, Wade Road, Basingstoke, Hants.

**Product** Citizen HQP-45 **Price** £795  
**Supplier** Citizen Europe, Wellington House, 4-10 Cowley Road, Uxbridge, Middlesex UB8 2XW, 0895 72621.

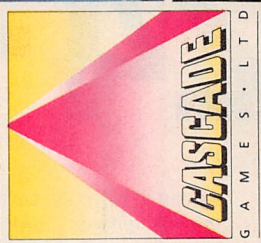
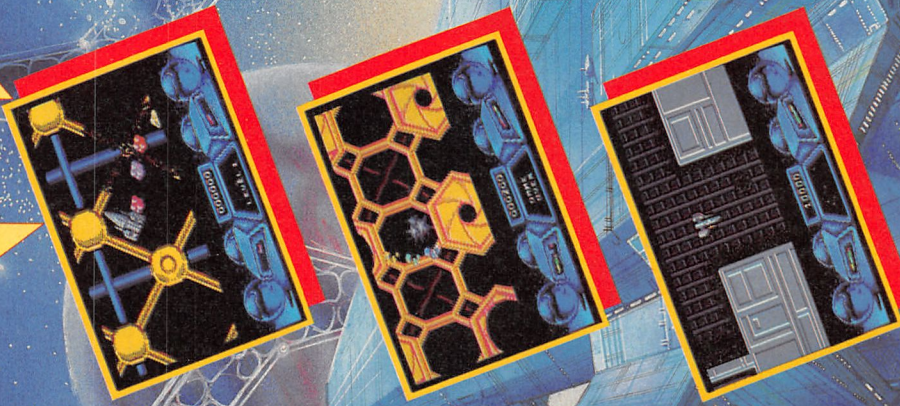


# IMPLOSION

When your world is  
under attack...  
FIGHT  
BACK

WITHOUT DOUBT, THE FASTEST EVER  
MULTI-SCREEN SCROLLING GAME COMPLETION.  
IMPLOSION WILL DELAY GAME PLAYER  
BY EVEN THE MOST ARDENT ACTION  
by 8 levels of 360° scrolling graphics.

- ▶ Dual play field.
- ▶ Arcade style multi-colour graphics.
- ▶ Arcade style multi-channel sound effects.
- ▶ Conceived and created in Association with Mindscape Inc.



COMMODORE 64 DISK....£14.95 COMMODORE 64 CASSETTE....£9.95  
SPECTRUM 48/128 CASSETTE....£8.95

1-3 HAYWRA CRESCENT, HARROGATE, HG1 5BC, England.  
Tel: (04233) 525325 Telex: 265871 MONREFG Quoting 72:MAG31320

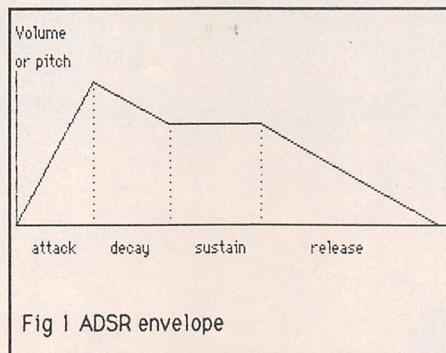


There are a number of ways of producing sound from a computer. The simplest is that used in the Spectrum, a piezo electric sounder (similar to those used in digital watches) which reacts to voltages applied to it. When the voltage changes, the shape of the sounder changes giving a click. If these clicks occur often enough then tone will be heard, and simple sound effects can be created.

By far the commonest method of producing sound from a computer is with a programmable sound generator or PSG. This is a self-contained chip that has all of the circuitry required to create tones, noises, envelopes, etc, plus the ability to do this with three or more separate voices.

The main feature of a PSG is that it is independent of the microprocessor. Once it has been instructed to do something, it does it, leaving the processor to get on with more important work.

sample form, or a mathematical representation of it. The sample is obtained by measuring the volume level at successive points, and storing the values. If this is performed fast enough, the numbers are an exact representation of the sound (this method is that used by the famous Fairlight synth).



frequency is determined by the number of cycles that occur every second, and a cycle is defined as the time for the wave to repeat itself.

**Tone or waveform** – most PSG only supply square waves and noise though some will do triangles and sawtooths (see figure two).

**Amplitude or volume** – normally in 16 levels; 0 being off, 16 being the loudest. The amplitude is the height, or loudness of the wave.

**Amplitude envelope** – this determines how the volume varies with time.

**Pitch envelope** – how the pitch varies with time.

With these, pretty well any sound can be synthesised; certainly anything needed in a computer game such as screams, bangs, and bells.

The frequency and wave shape are determined by the facilities available on the

# THINGS THAT GO BEEP IN THE NIGHT

In this, the first article in a new series on programming sound into your routines, Kenn Garroch explains some of the features of a dedicated sound chip.

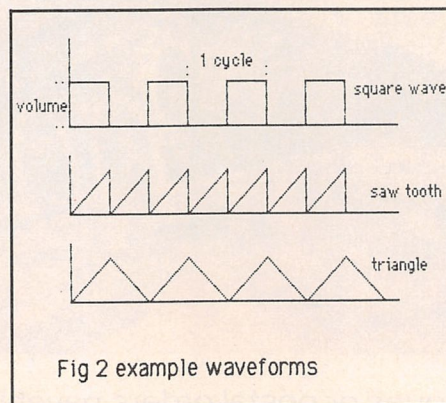
The capabilities of PSGs varies quite a lot, and what seem to be quite sophisticated microcomputers often have rather Basic sound generators. One of the more complex PSGs is SID in the C64, which has programmable envelopes (see figure one) for each of the three voices, built in filters, plus all of the usual noise and tone generators.

## Tone channels

Probably the commonest PSG chip used in home computers is the Yamaha YM2149 (also called the AY-3-8190/1/2). This contains good examples of the general facilities available on a PSG. It has three tone channels, each having independent pitch (4096 tones), a noise channel with 64 different pitches, a mixer that allows the various channels to be switched on and off, an overall volume control, and 10 envelope shapes.

The possible sounds that are available are limited more by programming than by the chip's inherent capabilities. For instance, it is possible to use a sound chip to reproduce sampled sound but only at the expense of using up a lot of processor time.

The most sophisticated of sound reproduction available on computers is the DAC method. Here, a sound is stored in its



To play the sound back, the numbers are simply converted back to voltages giving a near perfect rendition of the original. Computers that use this method need to have pretty fast processors, and only the newer 16/32 bit machines are really capable of doing this well (ST, Mac, Archimedes, etc).

## Frequency

To go back to the PSG method, most sounds can be created by using the chip's facilities in the right way. A sound is made up of the following:

**Frequency or pitch** – usually from 20–20000Hz (human hearing range). The

sound chip and so cannot be changed very much. The envelopes are a different case. Most Basics provide sound facilities for volume and pitch envelopes by changing the volume and pitch registers as the note is played.

## Attack and decay

An envelope is usually defined as having four periods: attack, decay, sustain, and release. The attack is the time taken for the sound to reach its maximum (pitch or amplitude). From here, the note decays until it reaches the sustain level at which it remains for the sustain time period, after this it goes into the release stage (see figure one).

Simple envelopes need only have attack and decay since the sustain and release stages are not always needed. The different sounds possible with amplitude envelopes include bells and dings where the attack is zero, ie, the sound starts decaying straight away, or waves on the shore where the attack is long. A little experimentation soon reveals what is possible.

*Kenn Garroch continues this series next week, with more on putting your sound chip to work.*



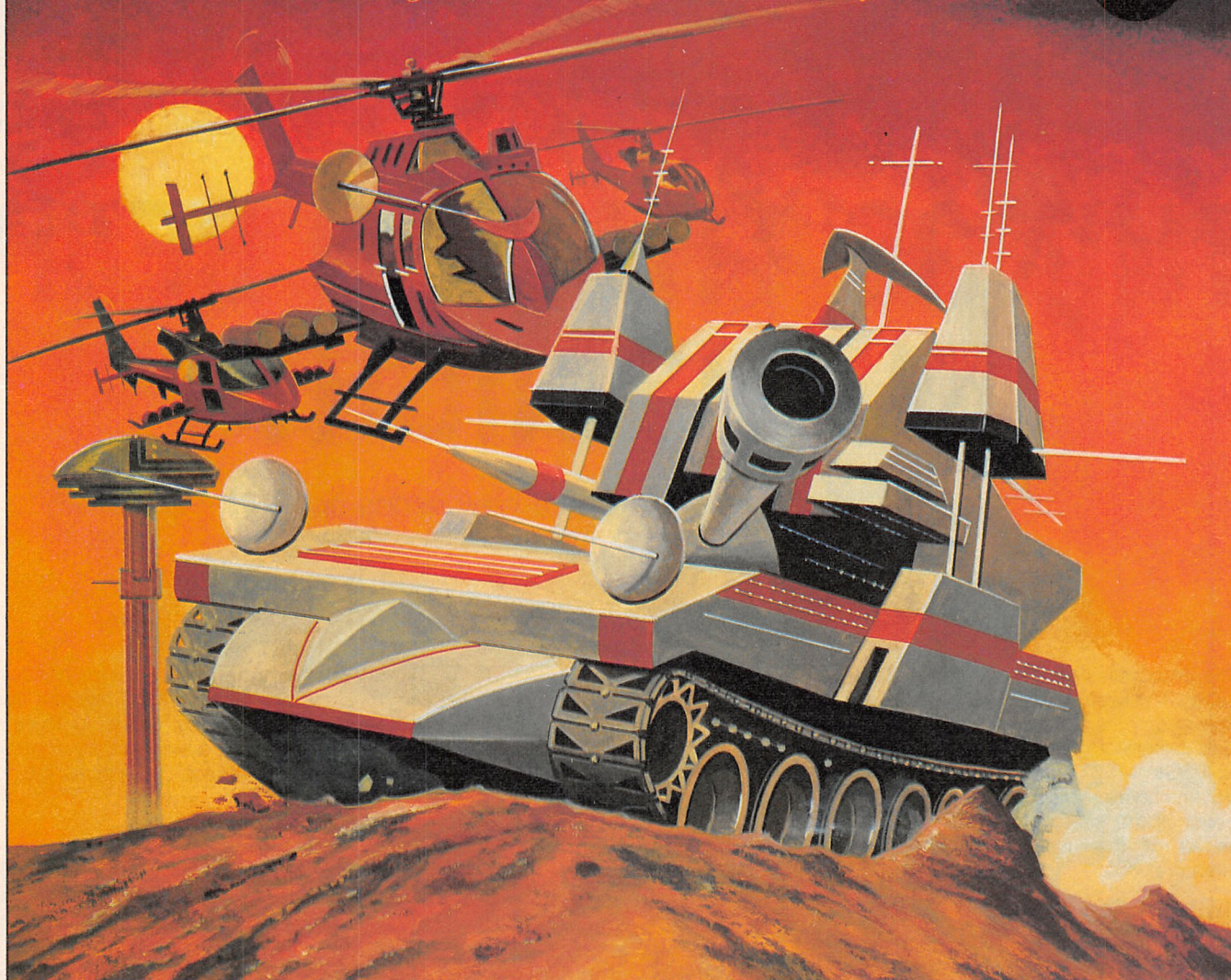
# REBEL

An action-packed four directional scrolling arcade game. Guide your tank through the heavily guarded compounds of the Agri-dustrial combine, using the giant laser and solar reflectors to blast your way into the next level, and finally... to Freedom!

Produced by Gang of Five

Commodore 64/128 Spectrum 48/128 £9.95

REBEL is available from all good software retailers, or directly from us.



Please make crossed cheques or postal orders payable to Virgin Games Ltd and send to Virgin Games, 2/4 Vernon Yard, Portobello Road, London W11 2DX.

PLEASE DO NOT POST COINS OR MONEY!

☐ Commodore 64/128 (£9.95) ☐ Spectrum 48/128 (£9.95)

Name \_\_\_\_\_

Address \_\_\_\_\_

Total money enclosed \_\_\_\_\_



# Graphics in 3D

Francis Botto looks at some of the principles behind the creation of 3D graphics.

To present graphic images which emulate visions of the real world, we have no option but to exploit 3D computer graphics. And with this added dimension, computer graphics can be transformed into a more authentic visual medium, creating the illusion that the TV or monitor is something more than just a flat screen.

If you have ever picked up a book on CAD or computer graphics, you'll have probably been confronted by a chapter on matrix theory, explaining all about matrix arithmetic and manipulation. But really, the only operation you need be aware of is matrix multiplication – with which you can write reasonable graphics or CAD-type programs.

Let's first consider the multiplication of two matrices:

$$\begin{bmatrix} \text{first matrix} \\ a & a \\ 11 & 12 \\ a & a \\ 21 & 22 \end{bmatrix} * \begin{bmatrix} \text{second matrix} \\ b & b \\ 11 & 12 \\ b & b \\ 21 & 22 \end{bmatrix}$$

$$\begin{bmatrix} (a * b + a * b) \\ (11 * 11 + 12 * 21) \\ (a * b + a * b) \\ (21 * 11 + 22 * 21) \\ (a * b + a * b) \\ (11 * 12 + 12 * 22) \\ (a * b + a * b) \\ (21 * 12 + 22 * 22) \end{bmatrix}$$

Of course, using symbols, the operation can be a little off putting – but you will see it is simply a matter of multiplying each row of the first matrix with the columns of the second.

Conveniently, the condition which must be satisfied for matrix multiplication to take place, namely, that the first matrix must possess the same number of columns as the second matrix has rows, allows us to multiply a matrix containing a theoretically infinite number of elements, using a simple 2\*2 matrix, like the previous 'second matrix'. For example,

$$\begin{bmatrix} \text{first matrix} \\ 1 & 2 \\ 2 & 1 \\ 2 & 4 \\ 2 & 3 \end{bmatrix} * \begin{bmatrix} \text{transformation matrix} \\ 0 & 1 \\ 1 & 0 \end{bmatrix} = \begin{bmatrix} \text{transformed matrix} \\ 2 & 1 \\ 1 & 2 \\ 4 & 2 \\ 3 & 2 \end{bmatrix}$$

If, for instance, the first matrix contained a number of x,y coordinates, we could

'transform' them using a 2\*2 transformation matrix as shown. Which would in turn give us a transformed set of coordinates – in other words we could manipulate a graphical shape according to requirements.

Exploiting the full potential of 3D graphics leads us to the elementary matrix ideas above. And we shall adopt homogenous coordinates from the start, so that our 3D coordinate, x,y,z, in actual fact becomes four dimensional – x,y,z,h. Nevertheless, we are still dealing with three dimensions in terms of graphics.

In a homogenous coordinate system, an (x,y) coordinate, in 2D graphics, is represented as (x,y,h), where h, the third dimension will be an arbitrary number. Otherwise, pure translation, or moving the shape in the x or y direction, is an impossible task.

The process naturally becomes a little more involved – in fact, the amount of arithmetic required is quadrupled. However, the process stays exactly the same, and just to prove it, figure one shows a 3D transformation using homogenous coordinates. Once again, the 'rows times co-

```

10 REM 3D_graphics (shell)
20 REM F M Botto * 1987 *
30 MODE 3
40 ON ERROR:RETURN
50 DIM graphics(4,16) :REM Unit cube [A]
60 DIM transform(16,4) :REM Transformation matrix [T]
70 DIM transformed(4,16) :REM Transformed coords [A*]
80
90 DEF PROCChain_program
100 PROCdimensions
110 PROCaxes
120 PROCtransform_matrix
130 PROCaccept_T_elements
140 PROCtransform
150 END
160
170 DEF PROCdimensions
180 PRINTTAB(0,0)"Do you ";
190 PRINT;"require axes? Y/N"
200 NS=GET$
210 IF NS="N" ENDPROC
220 ENDPROC
230
240 DEF PROCaxes
250 VDU 29,0;0;
260 MOVE 400,1000 :REM Draw x, y and z axes
270 DRAW 400,400 :REM y axis
280 DRAW 1000,400 :REM x axis
290 MOVE 400,400 :REM z axis
300 DRAW 20,20
310 ENDPROC
320
330 DEF PROCaccept_T_elements
340 RESTORE 2050 :REM Load transform. elements
350 FOR row=1 TO 4
360 FOR column=1 TO 4
370 READ transform(column,row)
380 NEXT
390 NEXT
400
410 RESTORE 1880 :REM Load cube p. vectors
420 FOR row=1 TO 16
430 FOR column=1 TO 4
440 READ graphics(column,row)
450 NEXT
460 NEXT
470 PROCdraw_delete_cube(1) :REM Draw unit cube.
480 ENDPROC
490
500 DEF PROCaccept_T_elements
510 PRINTTAB(0,0)"Do you wish to enter ";
520 PRINT;"[T] matrix or [T] matrices? Y/N"
530 IF GET$="N" VDU 22,4:ENDPROC
540 PRINTTAB(0,0)"Concatenation? (Y/N) ";
550 PRINT"
560 *FX 15,1
570 DS=GET$:IF DS="N" C#3:GOTO 630
580 PRINTTAB(0,0)"How many [T] matrices? (2 or 3)";
590 PRINT"
600 C#GET-50:C#2-C#
610 IF C#2 PROCunit_matrix
620 PRINTTAB(0,0)"
630 REPEAT
640 FOR row=1 TO 4
650 FOR column=1 TO 4
660 VDU 81F, (C#*25+column*6)-27,2*row,127
670 INPUT A :REM If A =COS or SIN
680 A#LEN(A$)
690 IF LEFT$(A$,3)="SIN" THEN B=RAD(VAL(RIGHT$(A$,A#-3))):A#SINB
700 IF LEFT$(A$,4)="-SIN" THEN B=RAD(VAL(RIGHT$(A$,A#-4))):A#-SINB
710 IF LEFT$(A$,3)="COS" THEN B=RAD(VAL(RIGHT$(A$,A#-3))):A#COSB
720 IF LEFT$(A$,4)="-COS" THEN B=RAD(VAL(RIGHT$(A$,A#-4))):A#-COSB
730 PRINTTAB((C#*25+column*6)-28,2*row);A;" ";
740 PRINTTAB((C#*25+column*6)-23,2*row);B;" ";
750 transform(column+C#*4,row)=A
760 transform(column+C#*4,row)=B
770 NEXT
780 NEXT
790 C#C#+1
800 UNTIL C#4

```

continued on page 21 ►



**NOW! £5 OFF ALL TRADE PRICES**

## YOUR MICRO DESERVES THE BEST...

When your home or business micro costs several hundreds of pounds, it deserves the finest repair facilities in Europe (well, probably!). And the finest prices – £5 off trade rates for a limited period only. ★ How? At Verran we use our own range of advanced automatic test equipment (now sold worldwide), backed by stringent 2-8 hours soak-rack testing. That means speed, ultra-low prices and, most important, guaranteed reliability. For the first three months we'll repair any fault free. For the next three, at half these quoted prices. ★ It's the finest service available.

★ Currently we handle over 3500 products on average every day. Providing services for such leading companies as Amstrad plc, Commodore Business Machines, Sinclair Research, Rank Xerox, Dixons, Currys, Boots, W H Smiths, John Menzies and many more. ★ Join them and take up our special offer now.

Recommended and Approved by

AMSTRAD ACORN ATARI SINCLAIR COMMODORE

★ SPECTRUM	TRADE £19.95	NOW £14.95
★ COMMODORE 64	TRADE £24	NOW £19
★ BBC B STD BRD	TRADE £30	NOW £25
★ AMSTRAD 464	TRADE £30	NOW £25
★ ELECTRON	TRADE £25	NOW £20

## EUROPE'S LEADING COMPUTER REPAIR CENTRE



### ...AND UNBEATABLE DISCOUNTS ON ALL COMPONENTS!!!

★ With over £500,000 worth of spares in stock, we can meet many of your specialised requirements. We've listed a few examples and for anything not displayed just call us and we'll quote immediately inclusive of first class post.

#### SPECTRUM SPARES

Z80 CPU	2.50
ULA 6C001	7.00
Power Supply	6.50
ROM	7.00
4116 RAMS	.75
ZTX 690	.40
ZTX 213	.40

#### Keyboard Membrane

Spectrum	3.00
Spectrum Plus	8.00
Metal Templates	3.00

#### COMMODORE SPARES

6510 Processor	12.00
6525 CIA	12.00
6581 Sid Chip	15.00
901225 Graphic ROM	10.00
901226 Basic ROM	10.00
901227 Kernal ROM	15.00
906114 House Keeper	10.00
6569 – VIC	18.00
4164 RAMS – Memory	1.00

#### Power Supplies

C64	19.50
C16	15.00

All the above prices include VAT but please enclose a further £1.50 post and packing on all component orders.

#### HOW TO CONTACT US

★ For quotes on computers not listed or on any component, telephone 0276 66266. (Quoting POP/369).

★ To send us your micro for repair, mail it securely packed, accompanied by cheque, postal order (made out to Verran Micro Maintenance Limited) or quote your Access or Barclaycard number. And to obtain your special discount quote POP/369.

**Verran**

Verran Micro-Maintenance Limited, Unit 2H & 2J, Albany Park, Frimley Road, Camberley, Surrey GU15 2PL. Telephone 0276 66266.



lums' mechanism is applied, giving rise to the transformation of the unit cube – the tranformation being an axonometric projection. And curiously, this type of transformation can be used to convert 3D images into 2D presentations – but more important, a frontal view can be created in this manner.

Talking about converting 3D points into 2D points, perhaps manifests a slight problem. For most basic interpreters generate graphics shapes using 2D points (or coordinates). So purely for plotting purposes, 3D graphics programs must facilitate the transformation of 3D into 2D points. And this may be achieved simply as follows: where an (x,y,z) point is plotted in two dimensions as (x-y/2, y-z/2). This simple conversion provides surprisingly authentic results.

To illustrate the idea of 3D transformation, listing one demonstrates the unit cube manipulation shown in figure one. And just to show some 3D rotations the program repeatedly transforms the cube – if, that is, you don't press the space bar which causes a halt. As before, the program allows you to enter your own transformation matrices, and just for interest's sake, here are two examples:

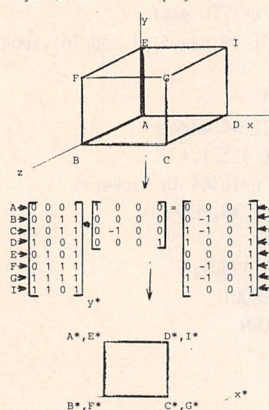
$$\begin{bmatrix} \cos 10 & \sin 10 & 0 & 0 \\ -\sin 10 & \cos 10 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

causes rotation, in 10 degree steps,

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

results in the transformation shown in figure 1.

Figure 1: Axonometric projection.



Lastly, if you run the program, you will be asked if you require concatenation. This is simply a term applied to a number of transformation matrices multiplied together, in order to produce a collective transformation. This is, in fact, a much used technique for providing a number of transformations – as opposed to tranforming a point more than once, which, by the way, requires vastly more computations.

The program was written on a BBC micro, but without too many specific commands, so it should be fairly easily converted.

◀ continued from page 19

```

810
820
830
840 FOR column=1 TO 4
850   FOR row=1 TO 4
860     transform(column,row)=transform(column+12,row)
870   NEXT: NEXT
880 IF D5="N" VDU22,4:ENDPROC
890
900
910
920
930
940 FOR row=1 TO 4
950   FOR column=1 TO 4
960     FOR rowcol=1 TO 4
970       result=transform(rowcol+4,row)*transform(column+8,rowcol)+result
980     NEXT
990     transformed(column,row)=result
1000    result=0
1010    NEXT: NEXT
1020
1030
1040
1050
1060 FOR row=1 TO 4
1070   FOR column=1 TO 4
1080     transform(column,row)=transformed(column,row)
1090   NEXT: NEXT
1100
1110
1120
1130
1140 FOR row=1 TO 4
1150   FOR column=1 TO 4
1160     FOR rowcol=1 TO 4
1170       result=transformed(rowcol,row)*transform(column+12,rowcol)+result
1180     NEXT
1190     transform(column,row)=result
1200    result=0
1210    NEXT: NEXT
1220 PRINTTAB(3,17);""
1230 FOR column=10 TO 40 STEP 10
1240   FOR row=14 TO 20 STEP 2
1250     PRINTTAB(column,row);transform(column/10,(row-12)/2);
1260     PRINTTAB(column+4,row);""
1270   NEXT: NEXT
1280 PRINTTAB(0,0);"Space bar"
1290 REPEAT: UNTIL INKEY(-99)
1300 VDU22,4
1310 PROCdraw_delete_cube(1)
1320 ENDPROC
1330
1340 DEF PROCtransform
1350   PRINTTAB(0,0);""
1360   PRINT""
1370   FOR row=1 TO 16
1380     FOR column=1 TO 4
1390       FOR rowcol=1 TO 4
1400         result=graphics(rowcol,row)*transform(column,rowcol)+result
1410       NEXT
1420       transformed(column,row)=result
1430       result=0
1440       NEXT: NEXT
1450     PROCdraw_delete_cube(0)
1460   FOR row=1 TO 16
1470     FOR column=1 TO 4
1480       graphics(column,row)=transformed(column,row)
1490     NEXT
1500     NEXT
1510     PROCdraw_delete_cube(1)
1520   IF N$="Y" PROCaxes
1530   REPEAT
1540     ON ERROR: IF ERR=44 GOTO 1540
1550     PROCtransform
1560     UNTIL INKEY(-1)
1570   UNTIL INKEY(-1)
1580
1590 DEF PROCdraw_delete_cube(colour)
1600   VDU29,400;400;
1610   GOSUB, colour
1620   REPEAT: UNTIL NOT INKEY(-99)
1630   MOVE (graphics(1,1)-graphics(3,1)/2)*200, (graphics(2,1)-graphics(3,1)/2)
1640   FOR row=1 TO 16
1650     REM Convert 4D vectors to 2D
1660     REM for plotting purposes
1670     graphics(1,row)=graphics(1,row)-graphics(3,row)/2
1680     graphics(2,row)=graphics(2,row)-graphics(3,row)/2
1690     DRAW graphics(1,row)*200,graphics(2,row)*200
1700   NEXT row
1710   REM restore graphics elements
1720   graphics(1,row)=graphics(1,row)+graphics(3,row)/2
1730   graphics(2,row)=graphics(2,row)+graphics(3,row)/2
1740   NEXT row
1750 ENDPROC
1760
1770 DEF PROCunit_matrix
1780   REM Nested into PROCconcat,
1790   REM [T] elements:
1800   REM 1 0 0 0
1810   REM 0 1 0 0
1820   REM 0 0 1 0
1830   REM 0 0 0 1
1840   FOR column=1 TO 4
1850     transform(column+4,row)=0
1860     IF column=row transform(column+4,row)=1
1870   NEXT: NEXT
1880 ENDPROC
1890
1900 REM x, y, z, h
1910 DATA 0, 0, 0, 1: REM A
1920 DATA 0, 0, 1, 1: REM B
1930 DATA 1, 0, 1, 1: REM C
1940 DATA 1, 0, 0, 1: REM D
1950 DATA 0, 0, 0, 1: REM E
1960 DATA 0, 1, 0, 1: REM F
1970 DATA 0, 1, 1, 1: REM G
1980 DATA 1, 1, 1, 1: REM H
1990 DATA 1, 0, 1, 1: REM I
2000 DATA 1, 1, 1, 1: REM J
2010 DATA 1, 1, 0, 1: REM K
2020 DATA 1, 0, 0, 1: REM L
2030 DATA 1, 0, 0, 1: REM M
2040
2050 DATA .996, .087, 0, 0 REM Default [T] elements.
2060 DATA -.087, .996, 0, 0 REM 5 degree rotation about
2070 DATA 0, 0, 1, 0 REM z axis.
2080 DATA 0, 0, 0, 1

```



## Custom RSX Manager

Simon T Goodwin

**T**his week features the second and concluding part of the program that will enable you to build up a database of RSX commands.

The whole database can be viewed using the View RSX Database option. Using the cursor keys and the Copy keys RSX's can be switched on or switched off. Any RSX that is switched on will be included in the custom RSX extension that is created by the Save Custom RSX Table routine. This

option creates a file containing all the RSX's that have been switched on. Do not worry about the screen corruption whilst the routine is running. The machine code is located at memory address 16384. The custom RSX file can be loaded and executed independently of the database using the following short program:

```
10 MEMORY 16383
20 LOAD "filename", 16384
30 CALL 16384
40 NEW
```

The whole database can be loaded and saved to disc or tape using the Load RSX Database and Save RSX Database options.

So for example to place XEN commands in the database, load a binary file containing the XEN file using the Load Machine Code Data option and then use the Store RSX Routine option to place the commands you want into the database (eg, :RSCROLL is located at 41629 and is nine bytes long).

Then use the View RSX Database Option to switch on the required commands. Then, either the whole database can be saved for future use, or the custom RSX table can be saved independently.

Finding out whether a particular RSX is compatible with this program may be a case of trial and error. It is worth bearing in mind that some RSX's are fundamentally incompatible with others even though they are relocatable. The :HEADER and :SHIFTCLS commands from my XEN program are good examples. To help beginners I have compiled a list of all my RSX commands that have been published in PCW together with the memory address and length of each individual routine. Readers can obtain this by sending me an SAE. In addition I will provide the program on tape or disc for £3 and £5.50 respectively. The address is 41 Fountains Drive, Acklam, Middlesbrough, Cleveland, TS5 7LW.

```
4000 REM Hex dump of routine
4005 found=0
4010 CLS
4015 FOR n=1 TO 255:CALL &BB1B:NEXT
4020 INPUT "Name of RSX>:",n$
4025 n$=UPPER$(n$)
4030 FOR n=1 TO 100
4032 IF n$=MID$(name$(n),1,LEN(n$)) AND
n$<>" " THEN found=n
4034 NEXT
4035 IF found=0 THEN PRINT "No such RSX"
:GOTO 4070
4036 LOCATE 1,2:PRINT name$(found);
Address "addr(found); Length "length(
found)
4038 PRINT
4039 CALL 12521,4
4040 FOR n=addr(found) TO addr(found)+le
ngth(found)-1
4050 PRINT HEX$(PEEK(n));";";
4060 NEXT
4065 CALL 12521,0
4070 PRINT:PRINT:GOSUB 500
4080 RETURN
4100 END
4997 :
4998 :
4999 :
5000 REM Create custom RSX table
5010 CLS
5020 FOR n=1 TO 100:PAPER 1:PEN 0:PRINT
name$(n)+STRING$(15-LEN(name$(n))," ");
IF flag(n)=1 THEN PRINT CHR$(8);"";
5022 PAPER 0:PEN 1:PRINT " ":NEXT
5030 PRINT:PRINT:
5035 PAPER 1:PEN 0
5040 PRINT "Use cursor keys to move and
COPY to select or de-select an RSX.Q ret
urns to menu";
5045 PAPER 0:PEN 1
5046 PRINT CHR$(23);CHR$(1):TAG
5047 locx=1:locy=1:GOSUB 800
5050 WHILE INKEY(9)
5051 IF INKEY(67)=0 THEN 5090
5055 IF INKEY(1)=0 AND locx<5 THEN GOSUB
```

```
800:locx=locx+1:GOSUB 800
5056 IF INKEY(8)=0 AND locx>1 THEN GOSUB
800:locx=locx-1:GOSUB 800
5058 IF INKEY(0)=0 AND locy>1 THEN GOSUB
800:locy=locy-1:GOSUB 800
5059 IF INKEY(2)=0 AND locy<20 THEN GOSU
B 800:locy=locy+1:GOSUB 800
5060 WEND
5070 use=((locy*5)-5)+locx:
5071 IF flag(use)=0 THEN flag(use)=1:MOV
E (128*locx)-16,398-(locy*16)+16:PRINT "
*";ELSE IF flag(use)=1 THEN flag(use)=0
:MOVE (128*locx)-16,398-(locy*16)+16:PRI
NT "*";
5073 FOR n=1 TO 100:NEXT
5080 GOTO 5050
5090 TAGOFF:PRINT CHR$(23);CHR$(0)
5100 RETURN
5997 :
5998 :
5999 :
6000 REM Catalogue
6010 CLS:CAT
6020 PRINT:PRINT:GOSUB 500:RETURN
6997 :
6998 :
6999 :
7000 REM Exit
7005 CLS
7010 GOSUB 600
7020 IF INKEY(43)=0 THEN END
7030 IF INKEY(46)=0 THEN RETURN
7040 END
7997 :
7998 :
7999 :
8000 REM Load RSX database
8005 CLS
8020 FOR n=1 TO 255:CALL &BB1B:NEXT
8030 INPUT "Filename >:",f$
8035 OPENIN f$
8040 INPUT #9,mak
8046 FOR n=1 TO mak+1
8047 INPUT #9,name$(n),addr(n),length(n)
,flag(n)
```

```
8050 NEXT
8055 INPUT #9,marker
8060 CALL 12521,4
8070 FOR n=16384 TO marker+1
8080 INPUT #9,a:POKE n,a
8090 NEXT
8100 CALL 12521,0
8110 CLOSEIN
8120 RETURN
8497 :
8498 :
8499 :
8500 REM Save RSX database
8505 CLS
8520 FOR n=1 TO 255:CALL &BB1B:NEXT
8530 INPUT "Filename >:",f$
8535 OPENOUT f$
8545 WRITE #9,mak
8546 FOR n=1 TO mak+1
8547 WRITE #9,name$(n),addr(n),length(n)
,flag(n)
8550 NEXT
8556 WRITE #9,marker
8560 CALL 12521,4
8570 FOR n=16384 TO marker+1
8580 WRITE #9,PEEK(n)
8590 NEXT
8600 CALL 12521,0
8610 CLOSEOUT
8620 RETURN
8997 :
8998 :
8999 :
9000 FOR n=12500 TO 12530
9010 READ a$:POKE n,VAL("&"+a$)
9020 NEXT
9025 REM call 12500,shift
9026 REM call 12521,bankswitch
9030 RETURN
9100 DATA DD,6E,4,DD,66,5,DD,5E,2,DD,56,
3,DD,4E,0,DD,46,1,ED,B0,C9,DD,7E,0,CD,5B
,BD,C9,0,0,0
9110 :
9120 :
9130 :
```



**Q. HOW CAN YOU SAVE OVER  
£285 ON AN AMIGA A500?**

**A. PHONE COMPUMART NOW!**

**(0509) 262259**

**OR**

**(0509) 266322**

**OR**

**(0509) 233893**



# PROGRAMMING: ATARI XL/XE

## ADS

Adam Newby

**P**art two of the ADS, assembler and disassembler, system is presented this week. The concluding episode can be seen at the same time next week, but for now, on with the instructions.

2 - Define labels. Selecting this option allows you to assign a value or a location of a line to a word, which can be used in programs as an operand. If you select option one (assign a value), then every time that label is used, it will be converted into the value specified. If you select option two (assign the address of a line), then the value representing the address of a line of your program is given to the label. This is meant primarily for use with the \*BYTE and \*WORD functions, so that you can store numbers, and use the values in them.

3 - Rewrite a line. Selecting this option will allow you to change a specified line. The line number will be displayed. Type in the instruction, press Return, then type the operand and press Return again. The new line will be entered into the program.

4 - Insert a line. This function allows you to insert a new line before another one. When prompted by the computer, type in the number of the line before which you want to insert a new line, and the line number of the new line. This will be displayed. As before, type the instruction, press Return, then type the operand, and press Return. The new line will be inserted.

5 - Delete a line. This will remove from the program the line you specify.

6 - List program. This displays the program, labels and start and end addresses, if it has been assembled.

7 - Assemble. This will assemble the program from the start address you specify onwards. The assembly is in two passes: the main program is assembled in pass one

and jumps, branches and labels are assembled in pass two.

8 - Run program. This does an X=USR (start address) for running programs which do not need any parameters to be passed and will run from and return to Basic.

9 - Return to main menu. This displays the assembler/disassembler selection page. Your program is retained in memory.

S - Save source data. This saves the data for your program as it was typed in (in assembly language).

X - Save assembled program. This will save the current program, or one at a specified location as assembled code.

L - Load source data. This will load from cassette the data for an assembled program. Note the start and end addresses down after it loads.

B - Create boot loader. This converts either the currently assembled program or one at a specified location into a form which will load and auto-run when you switch on the computer and hold down START.

```
460 IF ADDR+2-MEMPO(N)<=0 THEN POKE ADDR+1, MEMPO(N)-(ADDR+2):ADDR=ADDR+2:RETURN
470 POKE ADDR+1, 128-(128-(ADDR+2-MEMPO(N))):ADDR=ADDR+2:RETURN
480 IF CMD$="JMP_" OR CMD$="JSR_" THEN ADDR=ADDR+3:RETURN
490 ADDR=ADDR+2:RETURN
491 ? APLN$(IDP*6, IDP*6+5), " "; APR$(IDP*6, IDP*6+5), " "; A0$(IDP*6, IDP*6+5):RETURN

492 IF IAD$<>" " AND IAD$<>"$" THEN IF IAD$<"0" OR IAD$<"9" THEN GOSUB 3000:RETURN
493 IF IAD$<>" " AND IAD$<>"$" THEN V=VAL(A0$(IDP*6, IDP*6+5))
494 RETURN
495 POKE ADDR, 76:POKE ADDR+1, V-256*INT(V/256):POKE ADDR+2, INT(V/256)
496 ? APLN$(IDP*6, IDP*6+5), " JMPOUT "; A0$(IDP*6, IDP*6+5):ADDR=ADDR+3:IDP=IDP+1:RETURN
497 POKE ADDR, 32:POKE ADDR+1, V-256*INT(V/256):POKE ADDR+2, INT(V/256)
498 ? APLN$(IDP*6, IDP*6+5), " JSROUT "; A0$(IDP*6, IDP*6+5):ADDR=ADDR+3:IDP=IDP+1:RETURN
499 ? APLN$(IDP*6, IDP*6+5), " *WORDL "; A0$(IDP*6, IDP*6+5):RETURN
500 IF PASS=1 THEN ? :? " Pass 2: jumps and branches," :? :PFLG=1:GOSUB 600
505 IF LPASS=1 THEN ? :? " Pass 2: line address labels," :? :LPFLG=1:GOSUB 700
507 IF ST$(1,1)="$" THEN DEC=ADDR:GOSUB 800:EN$=HEX$:GOTO 510
508 EN$=STR$(ADDR)
510 ? :? "Assembly completed," :AFLG=1: ? "End address = " :EN$
515 TRAP 590: ? :? "Press:" :? :? " 1 to write new Program," :? " 2 to define label s," :? " 3 to rewrite a line,"
516 ? " 4 to insert a line," :? " 5 to delete a line," :? " 6 to list Program," :?
517 ? " 7 to assemble Program,"
518 ? " 8 to run Program," :? " 9 to return to main menu," :? " S to save source data,"
519 ? " X to save assembled Program," :? " L to load source Program," :? " . to load assembled Program,"
520 ? " B to create boot loader."
523 GET #1,C:INKEY$=CHR$(C)
524 IF INKEY$="1" THEN ? :GOTO 200
525 IF INKEY$="9" THEN GOTO 55
527 IF INKEY$="." THEN 5200
528 IF INKEY$="B" THEN 6000
529 IF INKEY$="2" THEN 1300
531 IF INKEY$="X" THEN 5000
532 IF INKEY$="3" THEN 1200
533 IF INKEY$="S" THEN 4000
534 IF INKEY$="L" THEN 4300
535 IF INKEY$="4" THEN 1000
536 IF INKEY$="5" THEN 1100
537 IF INKEY$="6" THEN 800
538 IF INKEY$="7" THEN 300
539 IF INKEY$="8" THEN 550
540 GOTO 523
550 IF AFLG=0 THEN ? "Program not yet assembled," :GOTO 515
560 X=USR(STADDR): ? "Program run," :GOTO 515
590 OPEN #1,4,0,"K":GOTO 523
600 FOR A=6 TO DP*6
610 IF APR$(A,A+5)="JMP_" OR APR$(A,A)="B" AND APR$(A+1,A+1)<>"I" AND APR$(A+1,A+1)<>"R" THEN GOSUB 640
615 IF APR$(A,A+5)="JSR_" THEN GOSUB 640
620 NEXT A
630 RETURN
640 IDP=A/6:ADDR=MEMPO(IDP):CMD$=APR$(A,A+5)
650 ? APLN$(A,A+5), " "; APR$(A,A+5), " "; A0$(A,A+5):GOSUB 430:RETURN
700 FOR Y=1 TO NAO
710 IF LT(Y)=1 THEN GOSUB 740
720 NEXT Y
730 RETURN
740 LA$=A0$(Y*6, Y*6+5)
750 FOR Z=6 TO DP*6
760 IF A0$(Z,Z+5)=LA$ THEN IDP=Z/6:ADDR=MEMPO(IDP):GOSUB 330
770 NEXT Z
```

continued on page 25 ►



# PROGRAMMING: ATARI XL/XE

◀ continued from page 24

```

780 RETURN
800 IF DP=0 THEN ? "Program not yet written.":GOTO 515
802 A=0:
805 FOR N=1 TO DP
810 ? APLN$(N*6,N*6+5);" ";APR$(N*6,N*6+5);" ";AO$(N*6,N*6+5)
820 IF PEEK(764)=28 THEN POKE 764,255:GOTO 515
825 A=A+1:IF A=23 THEN GET #1,C:A=0
830 NEXT N
835 ?
840 IF NAO=0 THEN ? :? "No labels."
850 IF NAO>0 THEN GOSUB 900
860 IF AFLG=0 THEN ? :? "Program not yet assembled.":GET #1,C:GOTO 515
870 ? :? "Start address = ":ST$: ? :? "End address = ":LEN$:GET #1,C:GOTO 515
900 FOR N=1 TO NAO
910 ? ADD$(N*6,N*6+5);" = ";
920 IF LT(N)=1 THEN ? "line ";
930 ? ADV$(N*6,N*6+5)
940 NEXT N
950 RETURN
1000 IF DP=MNLI THEN ? "No room for line.":GOTO 515
1005 ? :? "Insert before which line":INPUT DES$:IF LEN(DES$)<6 THEN FOR N=LEN(DES$)+1 TO 6:DES$(N,N)=":NEXT N
1007 ? :? "What line do you wish to insert":INPUT LI$:IF LEN(LI$)<6 THEN FOR N=LEN(LI$)+1 TO 6:LI$(N,N)=":NEXT N
1008 ROW=PEEK(84):IF ROW=23 THEN ? :POSITION 2,22
1010 ? LI$;" ";ROW=PEEK(84):INPUT CMD$
1020 IF LEN(CMD$)<6 THEN CMD$(LEN(CMD$)+1,6)=S$(1,6-LEN(CMD$))
1025 POSITION 16,ROW:INPUT O$:IF LEN(O$)<6 AND O$<>"" THEN FOR N=LEN(O$)+1 TO 6:O$(N,N)=":NEXT N
1027 IF O$="" THEN O$=" "
1030 FOR N=1 TO DP:IF APLN$(N*6,N*6+5)=DES$ THEN 1050
1040 NEXT N
1050 FOR M=DP TO N STEP -1:APLN$((M+1)*6,(M+1)*6+5)=APLN$(M*6,M*6+5):APR$((M+1)*6,(M+1)*6+5)=APR$(M*6,M*6+5)
1055 AO$((M+1)*6,(M+1)*6+5)=AO$(M*6,M*6+5):NEXT M
1060 APLN$(N*6,N*6+5)=LI$:APR$(N*6,N*6+5)=CMD$:AO$(N*6,N*6+5)=O$
1070 DP=DP+1:AFLG=0:GOTO 515
1100 ? :? "Line":INPUT DES$:IF LEN(DES$)<6 THEN FOR N=LEN(DES$)+1 TO 6:DES$(N,N)=":NEXT N
1105 ROW=PEEK(84):IF ROW=23 THEN ? :POSITION 2,22
1110 FOR N=1 TO DP:IF APLN$(N*6,N*6+5)=DES$ THEN 1130
1120 NEXT N
1125 ? "Line does not exist.":GOTO 515
1130 FOR M=N TO DP-1:APLN$((M+1)*6,(M+1)*6+5)=APLN$(M*6,M*6+5):APR$((M+1)*6,(M+1)*6+5)=APR$(M*6,M*6+5)
1135 AO$((M+1)*6,(M+1)*6+5)=AO$(M*6,M*6+5):NEXT M
1140 DP=DP-1:AFLG=0
1150 GOTO 515
1200 ? :? "Line":INPUT DES$:IF LEN(DES$)<6 THEN FOR N=LEN(DES$)+1 TO 6:DES$(N,N)=":NEXT N
1205 ROW=PEEK(84):IF ROW=23 THEN ? :POSITION 2,22
1210 ? DES$;" ";ROW=PEEK(84):INPUT CMD$
1220 IF LEN(CMD$)<6 THEN CMD$(LEN(CMD$)+1,6)=S$(1,6-LEN(CMD$))
1225 POSITION 16,ROW:INPUT O$:IF LEN(O$)<6 AND O$<>"" THEN FOR N=LEN(O$)+1 TO 6:O$(N,N)=":NEXT N
1227 IF O$="" THEN O$=" "
1230 FOR N=1 TO DP:IF APLN$(N*6,N*6+5)=DES$ THEN 1250
1240 NEXT N
1245 ? "Line does not exist.":GOTO 515
1250 APR$(N*6,N*6+5)=CMD$:AO$(N*6,N*6+5)=O$
1260 AFLG=0:GOTO 515
1300 IF NAO=MNLB THEN ? "No more room for labels.":GOTO 515
1310 ? :? "Label":INPUT LA$:IF LEN(LA$)<6 THEN FOR N=LEN(LA$)+1 TO 6:LA$(N,N)=":NEXT N
1315 ? :? "Press": ? :? "1 to assign a value.": ? "2 to assign an address of a line."
1316 GET #1,C:INKEY$=CHR$(C)
1317 IF INKEY$="1" THEN GOTO 1320
1318 IF INKEY$="2" THEN GOTO 1350
1319 GOTO 1316
1320 ? :? "Value for label":INPUT A$:IF LEN(A$)<6 THEN FOR N=LEN(A$)+1 TO 6:A$(N,N)=":NEXT N
1325 IF LEN(LA$)<6 THEN FOR N=LEN(LA$)+1 TO 6:LA$(N,N)=":NEXT N
1330 NAO=NAO+1:ADD$(NAO*6,NAO*6+5)=LA$:ADV$(NAO*6,NAO*6+5)=A$:LT(NAO)=0
1340 GOTO 515
1350 ? :? "Line":INPUT DES$:IF LEN(DES$)<6 THEN FOR N=LEN(DES$)+1 TO 6:DES$(N,N)=":NEXT N
1360 FOR N=1 TO DP
1370 IF APLN$(N*6,N*6+5)=DES$ THEN 1390
1380 NEXT N
1385 ? "Line does not exist.":GOTO 515
1390 NAO=NAO+1:ADD$(NAO*6,NAO*6+5)=LA$:ADV$(NAO*6,NAO*6+5)=DES$:LT(NAO)=1:GOTO 515
2000 OPEN #1,4,0,"K":GOTO 62
2010 OPEN #1,4,0,"K":GOTO 56
3000 IF NAO=0 THEN ? "No labels defined.":GOTO 515
3010 FOR N=6 TO NAO*6 STEP 6
3020 IF ADD$(N,N+5)=AO$(IDP*6,IDP*6+5) THEN GOTO 3040
3030 NEXT N
3035 ? "Undefined label in line ":APLN$(IDP*6,IDP*6+5):GOTO 515
3040 AODP=N/6
3042 IF LT(AODP)=1 THEN 3100
3050 IF ADV$(AODP*6,AODP*6+5)="$" THEN HEX$=ADV$(AODP*6,AODP*6+5):GOSUB 7000:RETURN
URN
3060 V=VAL(ADV$(AODP*6,AODP*6+5))
3070 RETURN
3100 FOR A=6 TO DP*6
3110 IF APLN$(A,A+5)=ADV$(AODP*6,AODP*6+5) THEN GOTO 3130
3120 NEXT A

```

continued on page 26 ▶



# PROGRAMMING: ATARI XL/XE

◀ continued from page 25

```

3125 ? "Label refering to non-existent line in line ":APLN$(IDP*6,IDP*6+5):GOT
0 515
3130 LR=A/6
3140 IF LR>IDP AND LPFLG=0 THEN LPASS=1:RETURN
3150 V=MEMPO(LR)
3160 RETURN
4000 IF DP=0 THEN ? "Program not yet written.":GOTO 515
4005 ? "Press Play & record on tape recorder, wait for the beep, then Press retu
rn."
4010 CLOSE #1:OPEN #1.8.0,"C:"
4020 PUT #1,DP:PUT #1,NAO
4030 FOR N=6 TO DP*6+5
4040 PUT #1,ASC(APLN$(N,N))
4050 NEXT N
4060 FOR N=6 TO DP*6+5
4070 PUT #1,ASC(APR$(N,N))
4080 NEXT N
4090 FOR N=6 TO DP*6+5
4100 PUT #1,ASC(AD$(N,N))
4110 NEXT N
4115 IF NAO=0 THEN CLOSE #1: ? "Save comleted.":SOUND 0,0,0:GOTO 515
4120 FOR N=6 TO NAO*6+5
4130 PUT #1,ASC(AD$(N,N))
4140 NEXT N
4150 FOR N=6 TO NAO*6+5
4160 PUT #1,ASC(ADV$(N,N))
4170 NEXT N
4180 FOR N=1 TO NAO
4190 PUT #1,LT(N)
4200 NEXT N
4210 CLOSE #1: ? "Save completed.":SOUND 0,0,0:GOTO 515
4300 ? "Press Play on tape recorder, wait for the beep, then Press return."
4310 CLOSE #1:OPEN #1.4.0,"C:"

```

## PROGRAMMING: BBC B

### Sprite Animator

Tim Fox

The concluding section of the program is presented this week. To use the sprite in your own programs add listing 3 to your program and at the beginning add \*LOAD SPRITE and \*LOAD SPRx (where x is the number one to nine). The sprite can now be animated simply by using the command PROC animate (width,

height, Xstart, Ystart, Xincrement, Yincrement, Xstop, Ystop).

Animation takes place on a mode 2 screen and if at any time the sprite co-ordinates matches Xstop or Ystop, the sprite stops. Locations &85 and &86 hold the address of the sprite data, so if you want to switch images, poke this area.

#### Listing 3

```

1REM procedure to incorporate in
2REM your own programs
3REM by Tim Fox
4:
10DEFPROCanimate(W%,?&82,X%,Y%,?&7E,?
&80,?&7F,?&81)
11REM amount of bytes in X direction
is half the amount of pixels
20?&83=W%/2
21REM high byte & low byte of address
of start of sprite data
30?&86=9
40?&85=0
41REM if the sprite is over a
certain size then reduce flicker
50IF (W*?&82)>=500 THEN?&84=255
60IF (W*?&82)<500 THEN?&84=0
61REM call the animation routine
70CALL &C00
80ENDPROC

```

#### Main Listing

```

480DEFPROCground
490IF (YU% MOD4)<0 AND((YU% MOD4)/4 <=
5) THEN YU%=4*(YU%/4-(YU% MOD4)/4)
500IF (YU% MOD4)<0 AND((YU% MOD4)/4>.5)
) THEN YU%=4*(YU%/4+(1-(YU% MOD4)/4))
510ENDPROC
520DEFPROCpoint(col)
530?(&1900+X*Y%+Y)=col
540GCOL0,col
550PROCblotch
560ENDPROC
570DEFPROCblotch
580MOVEX*XU%+B,Y*YU%+4
590MOVE (X+1)*XU%-B,Y*YU%+4
600PLOT85,X*XU%+B,(Y+1)*YU%-4
610PLOT85,(X+1)*XU%-B,(Y+1)*YU%-4
620ENDPROC
630DEFPROCcursor
640GCOL3,9
650PROCblotch
660ENDPROC
670DEFPROCvert
680G=GET:IFNOT((G>47 ANDG<58)OR(G>64 A
NDG<71))VDU7:GOTO680
690co=EVAL("&"+CHR$G)
700YY=Y
710FORX=0TOY%-1
720?(&1900+X*Y%+Y)=co

```

```

730PROCpoint(co)
740NEXT
750Y=YY
760ENDPROC
770DEFPROCchoriz
780G=GET:IFNOT((G>47 ANDG<58)OR(G>64 A
NDG<71))VDU7:GOTO780
790co=EVAL("&"+CHR$G)
800X=X
810FORX=0TOX%-1
820?(&1900+X*Y%+Y)=co
830PROCpoint(co)
840NEXT
850X=XX
860ENDPROC
870DEFPROCsave
880PROCprint
890G=GET:IFNOT((G>47 ANDG<58)VDU7:GOTO8
90
900OSCLI("SAVE SPR"+CHR$G+" 900 B00")
910ENDPROC
920DEFPROCwipe
930G=GET:IFNOT((G>47 ANDG<58)OR(G>64 A
NDG<71))VDU7:GOTO930
940co=EVAL("&"+CHR$G)
950GCOL0,co
960MOVE0,0:MOVEXU%X%,0:PLOT85,0,YU%*Y

```

continued on page 28 ▶

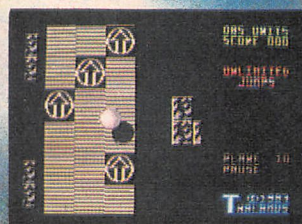
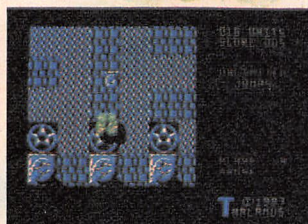


# THALAMUS

ONLY  
THE COOL AND  
CLEVER SURVIVE...

## QUEST DEX

THE  
QUEST FOR  
ULTIMATE  
DEXTERITY



AND STILL AVAILABLE...



SANXION



DELTA

BY STAVROS FASOULAS

**CBM 64/128** Cassette £ 9.99  
Disk £14.99

Thalamus Limited  
2 Minerva House  
Calleva Park  
Aldermaston  
Berkshire RG7 4QW  
Tel: (07356) 77261



# PROGRAMMING: BBC B

◀ continued from page 26

%:PLOT85,XU%\*X%,YU%\*Y%

9706C0L0,7

980PROCgrid

990FORL%=0TO(X%\*Y%)-1

1000L%?%1900=co

1010NEXT

1020ENDPROC

1030DEFPROCprint

1040XX=X:YY=Y

1050F%=%900

1060FORX=0TOX%-1STEP2

1070FORY=Y%-1TOYSTEP-1

1080L%=?(&1900+X\*Y%+Y)

1090L1%=?(&1900+(X+1)\*Y%+Y)

1100DATA0,1,4,5,16,17,20,21,64,65,68,69,80,81,84,85

1110RESTORE

1120FORL=0TOL%:READA:NEXT:A=A\*2

1130RESTORE

1140FORL=0TOL1%:READB:NEXT

1150X1=65+X/2

1160Y1=(Y%-Y)+100

1170?(&3000+(X1\*B)+&280\*(Y1 DIV8)+(Y1 AND7))=A+B

1180?F%=A+B

1190F%=F%+1

1200NEXT

1210NEXT

1220X=XX:Y=YY

1230ENDPROC

1240DEFPROCchelp

1250FL=TRUE

1260PRINTTAB(14,2) " ":COLOUR3:PRIN

TAB(14,0)"Press"TAB(14,1)"Space"TAB(14,2)"to"TAB(14,3)"move"TAB(14,4)"text"

1270VDU28,19,31,19,0

1280C0LOUR6

1290RESTORE1530

1300READa:FORL=1TOa

1310READa\$:PRINT;" a\$ " ;

1320\*FX15,0

1330K=GET:NEXT

1340CLS

1350VDU26:COLOUR1:PRINTTAB(14,0)"Q-help"TAB(14,1)SPC5TAB(14,2)SPC5TAB(14,3)SPC5TAB(14,4)SPC5

1360FL=FALSE

1370ENDPROC

1380DEFPROCgrid

1390XX=X:YY=Y

1400FORX=0TOXU%\*X% STEPXU%

1410MOVEX,0:DRAWX,YU%\*Y%

1420NEXT

1430FORY=0TOYU%\*Y% STEPYU%

1440MOVE0,Y:DRAWXU%\*X%,Y

1450NEXT

1460X=XX:Y=YY

1470ENDPROC

1480DEFPROCerr

1490PROCpoint(0)

1500IFFL THENCLS:VDU26

1510FL=FALSE

1520ENDPROC

1530DATA85

1540DATAPress,W,then,a,number,to,wipe,g  
rid,in,chosen,colour,"","","","","Press,H  
,then,a,number,to,fill,present,row,in,cho  
osen,colour,"","","","","Press,V,then,a,n  
umber,to,fill,present,column,in,chosen,c  
olour,"","","","","Press,P,to,draw,  
1550DATAlifsize,sprite,"","","","Pre  
ss,the,appropriate,colour,number,to,fill  
,present,square,"","","","","Press,approp  
riate,cursors,to,move,cursor,"","","",""  
,Press,S,then,a,number,to,save,sprite

## PROGRAMMING: SPECTRUM

### Catacombs

P Fox

**T**his program, which is listed over three weeks, is a *Gauntlet* style game for up to one player! It also includes a level

designer for up to twelve levels. The game and loading instructions appear next week.

```
10 CLS : PRINT AT 16,0; PAPER 2;" CATAC
OMB          BY P.FOX "
20 PRINT AT 17,23;"LEVEL";AT 21,2;"HEAL
TH ENERGY SCORE KEYS"
30 POKE 65011,136: POKE 65012,19: POKE
65000,1: POKE 65001,1
40 RANDOMIZE USR 60000
50 CLS : LET SC=PEEK 65008+PEEK 65009*2
56+PEEK 65010*100
60 IF PEEK 65010=11 THEN PRINT AT 8,11
;"GAME BONUS": LET SC=SC+1000
70 PRINT AT 10,11;"SCORE=";SC
80 FOR C=1 TO 10: IF H(C)<SC THEN GO T
O 100
90 NEXT C: GO TO 1030
100 IF C=10 THEN LET H(C)=SC: GO TO 120
110 FOR D=10 TO C+1 STEP -1: LET H$(D)=H
$(D-1): LET H(D)=H(D-1): NEXT D: LET H(C)
=SC
120 INPUT "NAME "; LINE H$(C): GO TO 112
0
999 STOP
1000 CLEAR 45055: LOAD ""CODE : LOAD ""CO
DE : POKE 23607,231
1010 LET A$="WELCOME TO CATACOMB BY PAUL
FOX WELCOME TO CATACOMB BY PAUL FOX ": DI
M H$(10,10): DIM H(10)
1020 RESTORE 2000: FOR C=1 TO 10: READ H$
(C),H(C): NEXT C
```

```
1030 BORDER 0: PAPER 0: INK 7: CLS
1040 PRINT AT 12,10;"1 START GAME";AT 14,
10;"2 EDIT GAME";AT 16,10;"3 SCORE TABLE"
;AT 18,10;"4 SAVE LEVELS";AT 20,10;"5 LOA
D LEVELS"
1050 RESTORE 2010: LET C=0: LET VAR=0
1060 PRINT PAPER 2;AT 8,0;A$(C+1 TO C+32
): LET C=(C+1 AND C<31): READ NOTE: IF NO
TE=255 THEN RESTORE 2010: LET VAR=(VAR+2
AND VAR<30): READ NOTE
1070 BEEP .2,NOTE+VAR
1080 LET B$=INKEY$: IF B$="1" THEN GO TO
10
1090 IF B$="2" THEN GO TO 1200
1100 IF B$="3" THEN GO TO 1120
1105 IF B$="4" THEN GO TO 1400
1106 IF B$="5" THEN GO TO 1420
1110 GO TO 1060
1120 REM HIGH SCORE TABLE
1130 CLS : PRINT AT 0,0; PAPER 2;"
HIGH SCORE TABLE "
1140 FOR C=1 TO 10: PRINT AT C*2,5;H$(C);
AT C*2,23;H(C): BEEP .02,10-C: NEXT C: PA
USE 0: GO TO 1030
1200 REM GAME EDITOR
1210 CLS : INPUT "LEVEL(>11=END)";LEV: IF
LEV>11 THEN GO TO 1030
1220 LET X=0: LET MD=0: LET Y=0: LET GRA=
0: LET ADDR=45056+LEV*512: FOR C=0 TO 511
```

```
: POKE C+58112,PEEK (C+ADDR): NEXT C: RAN
DOMIZE USR 62000: PRINT AT 16,0; PAPER 2;
" LEVEL ADDR X.POS Y.POS MODE "
1230 PRINT AT 17,1;LEV:AT 17,7;ADDR:AT 17
,13;X;AT 17,19;Y;AT 17,25;"OVER"
1240 PRINT AT 19,0:: POKE 23607,246: FOR
C=32 TO 127: PRINT CHR$(C):: NEXT C: POK
E 23607,231
1300 LET B$=INKEY$: IF B$="0" OR B$="9" T
HEN PRINT OVER 1; PAPER 0;AT INT (GRA/3
2)+19,((GRA/32)-INT (GRA/32))*32;" ": LET
GRA=GRA+(B$="0" AND GRA<95)-(B$="9" AND
GRA>0): PRINT OVER 1; PAPER 5; INK 1;AT
INT (GRA/32)+19,((GRA/32)-INT (GRA/32))*3
2;" ": GO TO 1300
1305 IF B$=" " THEN GO TO 1200
1310 IF B$="P" THEN BEEP .05,5: LET MD=(
MD=0): PRINT AT 17,25;"FILL" AND MD=1);(
"OVER" AND MD=0): GO TO 1300
1320 PRINT AT Y,X; OVER 1; PAPER 0;" ": L
ET X=X+(B$="X" AND X<31)-(B$="Z" AND X>0)
: LET Y=Y+(B$="K" AND Y<15)-(B$="O" AND Y
>0)
1340 PRINT AT 17,13;X;" ":AT 17,19;Y;" ":
IF MD=0 THEN PRINT PAPER 5;AT Y,X; OVE
R 1;" ": GO TO 1300
1350 POKE 23607,246: PRINT AT Y,X; PAPER
5;CHR$(GRA+32): POKE 23607,231: POKE ADD
```

continued on page 30 ►



## A MUCH BETTER DEAL - WEEK AFTER WEEK

Amstrad PCW 8256 Computer/Word Processor + Monitor + Printer.....	RRP	WAVE
	458.85	355.65 (A)
Amstrad PC1512 Business Pack including PC1512 double drive mono + DMP3000 printer + Supercalc 3 + Wordstar 1512 while stocks last.....	RRP	WAVE
	977.10	598.50 (ANC)
Bondwell BW34 twin drive, green screen 640K inc. 12 month on site warranty.....	RRP	WAVE
	769.35	503.16 (ANC)
SBC FD PCXT 640K Twin drive, Green Screen inc. 12 month on site warranty.....	RRP	WAVE
	688.85	527.00 (ANC)
Commodore Amiga A500 inc. Free Deluxe Paint..... RRP 79.95 + Free £50 Holiday Voucher with CBM Privilege Voucher	RRP	WAVE
	573.85	£368.76 (ANC)
CF2 3" DS/for all 3" drives (cased) box of 10.....	RRP	WAVE
		18.64 (D)
Bulk by BASF, Xidex, RPS, etc. 5.25" DS/DD 40T PKT 25.....	RRP	WAVE
		9.57 (D)
Bulk by Wabash, Datatech, RPS, etc. 3.5" DS/DD 135 TP1 PKT 10.....	RRP	WAVE
		15.65 (D)
Mini Scribe—PC 30Mb fast low power hard card—PC.....	RRP	WAVE
	550.36	272.71 (A)
Locoscript 2, PCW (+ VAT 56P).....	RRP	WAVE
	19.95	16.50 (D)
DD-1 Disc drive CPC 464.....	RRP	WAVE
	159.95	150.00 (B)
Epson LX86 Printer (friction).....	RRP	WAVE
	275.00	183.75 (A)
Amstrad PC 1640 double drive colour.....	RRP	WAVE
	1033.85	809.10 (ANC)

All current chart games software retail less 25% + £1 P&P

★ ★ ★ ★ ★ WAVE PRICES EXCLUDE VAT.

ANC 3 day £9.00. Next day £12.00. Admin. Offices. Callers by appointment only.

UK Post & Ins. (A) £5.00 (B) £4.00 (C) £3.00 (D) £2.00 (E) £1.00 (F) 50p.

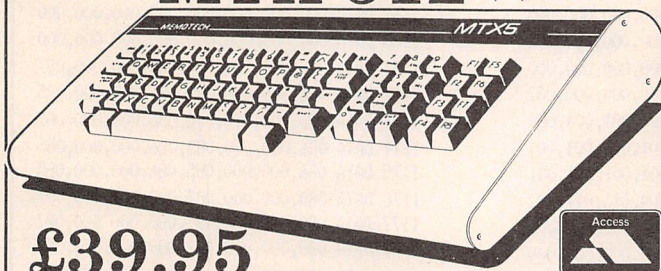
Despatched by return of post. Prices in this advert are valid for 14 days.

**W.A.V.E. (Dept. POP 0408)**

Walney Audio Video & Electrical

53 Shearwater Crescent, Barrow-in-Furness,  
Cumbria LA14 3JP. Telephone: 0229 44753/29109

## ★ MEMOTECH MTX 512 ★



**£39.95**

Plus £3.05 postage (total £43)

☆ 64K User Ram ☆

☆ Z80 Processor ☆

☆ 3 Channel Sound ☆

☆ 16 Colours ☆

☆ Extensive Software ☆

☆ CP/M 2.2 Adaptable ☆

☆ Fully Guaranteed ☆

☆☆☆☆☆☆☆☆☆☆

Further details/orders to:

**UK HOME COMPUTERS**

82 Churchward Avenue, Swindon, Wilts SN2 1NH

Tel: 0793 695034

All prices VAT & delivery inclusive

## CHOP-CHOP

Evesham Micros... Your friends in the country

### 520 STFM NEW LOW PRICE

**Only £279.00**  
*In stock now!*

520STFM with 1MEG memory upgrade installed £338.00

1040 STF £479.00 SM125 M.monitor £119.00

MEGA ST 2 £949.00 MEGA ST 4 £1249.00

**All ST prices include: mouse etc. PLUS 5 disks full of s'ware including demos, utility, wordpro & game**

Philips CM8833 Hi-res colour monitor c/w ST cable £279.00  
(ONLY £269.00 if bought with an ST)

**1MEG MEMORY UPGRADE (STFM ONLY) £59.00**  
(Requires soldering, free fitting if you buy a new ST from us)

**3.5" disks** 10..... £11.95 in 10 cap plastic case £13.95  
25..... £27.95 in 40 cap plastic case £34.95  
Fully guaranteed double sided media.

## AMSTRAD 1512/1640

ALL PRICES VAT & DELIVERY INCLUSIVE

**1640 IN STOCK NOW!**

1640ECD single floppy	£889.00	STANDARD
1640ECD twin floppy	£989.00	AMSTRAD
1640ECD HD 20MEG	£1299.00	MODELS
1640ECD HD 32MEG (1 floppy)	£1229.00	EVEHAM
1640ECD HD 32MEG (2 floppy)	£1329.00	32 & 42
1640ECD HD 42MEG (1 floppy)	£1379.00	MEG
		MODELS

### FULL 1512 RANGE INCLUDING THE HIGHLY POPULAR EVESHAM 32/42 MEG 640K SPECIALS

MONO COLOUR

SD-MM	£479.00	STANDARD	SD-CM	£649.00
DD-MM	£579.00	AMSTRAD	DD-CM	£759.00
HD20MEG	£949.00	MODELS	HD 20MEG	£1019.00
SD 32MEG	£829.00	EVEHAM	SD 32MEG	£999.00
DD 32MEG	£949.00	32 & 42 MEG	DD 32MEG	£1119.00
SD 42MEG	£1029.00	MODELS	SD 42MEG	£1169.00

All 32 & 42 MEG models are upgraded to 640k (£20.00 extra on standard models). We use top quality MINISCRIBE hard disk units in our conversions (as used by you know who).

**AMSTRAD OFFICE**... Consists of PC1512 DD/MM, DMP3160 Printer, Wordstar & Supercalc... OUR PRICE ONLY... £729.00

**EVEHAM OFFICE**... As above but upgraded to 640K and fitted with 32MEG hard card... A USEFUL BUNDLE... £1089.00

**32MEG HARDCARD**... The easy way to upgrade to hard disk, just plugs in. Supplied ready configured..... ONLY..... £329.00

## Commodore

64C computer only	£149.95	Connoisseurs pack	£199.95
C128 computer only	£199.95	C128 starter pack	£239.95
1541C d.drive	£189.95	Music exp. pack	£75.00
Excelsior+ CBM compatible disk drive	£159.95		
Excelsior+ as above c/w Freeze Machine cart.	£179.95		

**SCOOP purchase** Complete brand new '64 circuit boards. Use for repair, spare or upgrade a VIC-20. Limited qty. **only £45.00**

**AMIGA** A great offer on the fabulous new 500 model. Includes TV modulator, Deluxe Paint, Deluxe Print or similar & 5 disks of public domain s'ware. Price includes voucher allowance. **only £469.00**

Philips CM8833 hi-res colour monitor, STEREO sound, Inc cable £279.00  
(ONLY £269.00 if bought with an AMIGA)

## PRINTERS PRICES INCLUDE VAT, DELIVERY & CABLE

We use and recommend Star printers, they offer the best combination of features, print quality, reliability and value for money. Sheet feeders in stock.

Star **NL-10** New low price (state cartridge type) £219.00

..SPECIAL: 2 spare ribbons value £13.90 FREE with **NL-10**..

Star **NX-15** Wide carriage version of **NL-10** £319.00

Star **NB24-10** Brilliant 24 pin printer 216cps 72cps NLQ £479.00

Star **NB24-15** Wide carriage 24 pin £599.00

PANASONIC KXP-1081 Best sub £200.00 model £179.00

Many other models in stock at competitive prices

All prices include VAT/delivery. Next day delivery £5.00 extra.

### How to order

Send cheque, P.O. or ACCESS/VISA details  
By phone with ACCESS/VISA details  
Govt., Educational or PLC orders accepted  
Same day despatch whenever possible  
Callers welcome, open 6 days 9.30-5.30  
All goods subject to availability E.&O.E.  
TELEX: 333294 EMICRO

**Evesham Micros**  
63 BRIDGE STREET  
EVEHAM  
WORCS WR11 4SF  
Tel: 0386 765500

Also at: 1756 Pershore Rd., Cotteridge, Birmingham B30 3BH Tel: 021 458 4564



# PROGRAMMING: SPECTRUM

◀ continued from page 28

```
R=X+Y*32,BRA: 60 TO 1300
1400 REM SAVE LEVELS
1410 SAVE "LEVEL"CODE 45056,6144: VERIFY
"LEVEL"CODE 45056,6144: 60 TO 1030
1420 REM LOAD LEVELS
1430 LOAD "LEVEL"CODE : 60 TO 1030
2000 DATA "CHEAT",5000,"BRILL",1000,"FAB"
,500,"GOOD",100,"ROTTEN",10,"?",0,"?",0,"
?",0,"?",0,"?",0
2010 DATA 0,-2,1,0,4,3,2,0,4,2,5,4,8,7,6,
4,5,7,6,8,7,9,8,7,6,4
2020 DATA 255
      1 REM section 1
      10 REM room data
      20 CLEAR 45055: FOR c=45056 TO 45056+15
99: READ a: POKE c,a: NEXT c
      30 LOAD ""
1000 DATA 009,001,001,001,001,001,001,001,001
1001 DATA 001,001,001,001,001,001,001,001,001
1002 DATA 001,001,001,001,001,001,001,001,001
1003 DATA 001,001,001,001,001,001,001,001,010
1004 DATA 002,000,000,020,000,000,000,000,000
1005 DATA 000,000,000,000,000,000,000,000,000
1006 DATA 000,000,000,000,000,000,000,000,000
1007 DATA 000,000,000,000,000,000,000,020,002
1008 DATA 002,000,000,000,000,000,000,000,000
1009 DATA 000,000,000,000,000,000,000,000,000
1010 DATA 000,000,000,000,000,000,000,000,000
1011 DATA 000,000,000,000,000,000,000,000,002
1012 DATA 002,000,000,009,001,001,001,001,001
1013 DATA 001,001,001,001,001,001,001,001,004,000
1014 DATA 000,003,001,001,001,001,001,001,001
1015 DATA 001,001,001,001,010,000,000,002,000
1016 DATA 002,000,000,002,000,000,000,000,000
1017 DATA 000,000,000,000,000,000,000,000,000
1018 DATA 000,000,000,000,000,000,000,000,000
1019 DATA 000,000,000,000,000,002,000,000,002
1020 DATA 002,000,000,002,000,000,000,000,000
1021 DATA 000,000,000,000,000,000,000,000,000
1022 DATA 000,000,000,000,000,000,000,000,000
1023 DATA 000,000,000,000,002,000,000,000,002
1024 DATA 002,000,000,005,000,000,006,020
1025 DATA 000,009,001,001,001,004,000,000,000
1026 DATA 000,000,003,001,001,001,010,000,000
1027 DATA 020,006,000,000,005,000,000,002,000
1028 DATA 002,000,000,000,000,000,000,002,000
1029 DATA 000,002,081,082,020,000,000,000,000
1030 DATA 000,000,000,000,000,002,073,002,000
1031 DATA 000,002,000,000,000,000,000,000,002
1032 DATA 002,000,000,000,000,000,000,002,000
1033 DATA 000,002,083,084,020,000,000,000,000
1034 DATA 000,000,000,000,074,075,002,000,000
1035 DATA 000,002,000,000,000,000,000,000,002
1036 DATA 002,000,000,006,000,000,005,022
1037 DATA 000,007,001,001,001,001,001,001,001
1038 DATA 001,001,001,001,001,001,008,000,000
1039 DATA 021,005,000,000,006,000,000,002,000
1040 DATA 002,000,000,002,000,000,000,000,000
1041 DATA 000,000,000,000,000,000,000,000,000
1042 DATA 000,000,000,000,000,000,000,000,000
1043 DATA 000,000,000,000,002,000,000,000,002
1044 DATA 002,000,000,002,000,000,000,000,000
1045 DATA 000,000,000,000,000,000,000,000,000
1046 DATA 000,000,000,000,000,000,000,000,000
1047 DATA 000,000,000,000,000,002,000,000,002
1048 DATA 002,000,000,007,001,001,001,001,001
1049 DATA 001,001,001,001,001,001,004,023
1050 DATA 000,003,001,001,001,001,001,001,001
1051 DATA 001,001,001,001,008,000,000,000,002
1052 DATA 002,000,000,000,000,000,000,000,000
1053 DATA 000,000,000,000,000,000,000,000,000
1054 DATA 000,000,000,000,000,000,000,000,000
```

```
1055 DATA 000,000,000,000,000,000,000,002
1056 DATA 002,020,000,000,000,000,000,000,000
1057 DATA 000,000,000,000,000,000,000,000,000
1058 DATA 000,000,000,000,000,000,000,000,000
1059 DATA 000,000,000,000,000,000,000,020,002
1060 DATA 007,001,001,001,001,001,001,001,001
1061 DATA 001,001,001,001,001,001,001,001,001
1062 DATA 001,001,001,001,001,001,001,001,001
1063 DATA 001,001,001,001,001,001,001,001,008
1064 DATA 009,001,001,013,001,001,013,001,001
1065 DATA 001,013,001,001,013,001,001,001,001
1066 DATA 001,001,001,001,001,001,001,001,001
1067 DATA 001,001,001,001,001,001,001,001,010
1068 DATA 002,072,073,002,081,082,002,072
1069 DATA 073,002,020,023,002,000,000,000,000
1070 DATA 000,072,073,000,000,000,000,000,000
1071 DATA 000,000,000,000,000,000,000,000,002
1072 DATA 002,074,075,002,083,084,002,074
1073 DATA 075,002,000,000,002,000,000,000,000
1074 DATA 000,074,075,000,000,000,000,000,000
1075 DATA 000,000,000,000,000,000,000,000,002
1076 DATA 002,000,000,000,002,000,000,002,000
1077 DATA 000,002,000,000,005,000,000,000,000
1078 DATA 000,000,000,000,000,000,000,000,000
1079 DATA 000,000,000,000,006,000,000,000,002
1080 DATA 002,000,000,002,000,000,002,000,000
1081 DATA 000,002,000,000,000,000,000,000,000
1082 DATA 000,000,000,000,000,000,000,000,000
1083 DATA 000,000,072,073,002,000,000,002,000
1084 DATA 002,000,000,002,000,000,002,000,000
1085 DATA 000,002,020,000,000,000,000,000,000
1086 DATA 000,000,000,000,000,000,000,000,000
1087 DATA 000,000,074,075,002,000,000,002,000
1088 DATA 002,000,000,005,000,000,000,005,000
1089 DATA 000,012,001,001,001,001,001,001,001
1090 DATA 001,001,001,001,001,001,001,001,001
1091 DATA 001,001,001,001,008,000,000,000,002
1092 DATA 002,000,000,000,000,000,000,000,000
1093 DATA 000,002,000,000,000,000,000,000,000
1094 DATA 000,000,000,000,000,000,000,000,000
1095 DATA 000,000,000,000,000,000,000,000,002
1096 DATA 002,000,000,000,000,000,000,000,000
1097 DATA 000,002,000,000,000,000,000,000,000
1098 DATA 000,000,000,000,000,000,000,000,000
1099 DATA 000,000,000,000,000,000,000,000,002
1100 DATA 002,000,000,003,001,001,004,000,000
1101 DATA 000,012,001,001,001,001,001,001,001
1102 DATA 001,001,001,001,001,001,001,001,001
1103 DATA 001,001,001,001,004,016,017,002,000
1104 DATA 002,000,000,000,000,000,000,000,000
1105 DATA 000,005,020,000,000,000,000,000,000
1106 DATA 000,000,000,000,000,000,000,000,000
1107 DATA 000,000,000,000,000,000,000,000,002
1108 DATA 002,000,000,000,000,000,000,000,000
1109 DATA 000,000,000,000,000,000,000,000,000
1110 DATA 000,000,000,000,000,000,000,000,000
1111 DATA 000,000,000,000,000,000,000,000,002
1112 DATA 002,000,000,000,000,000,000,000,000
1113 DATA 000,000,000,000,000,000,000,000,000
1114 DATA 000,020,000,000,000,000,000,000,000
1115 DATA 000,000,000,000,000,000,000,000,002
1116 DATA 002,000,000,000,000,000,000,000,000
1117 DATA 000,006,000,000,000,000,000,000,000
1118 DATA 000,000,000,000,000,000,000,000,000
1119 DATA 000,000,000,000,000,000,000,000,002
1120 DATA 002,023,000,000,000,000,000,000,000
1121 DATA 021,002,020,000,000,000,000,000,000
1122 DATA 000,000,000,000,000,000,000,000,000
1123 DATA 000,000,000,000,000,000,000,023,002
1124 DATA 007,001,001,001,001,001,001,001,001
1125 DATA 001,014,001,001,001,001,001,001,001
1126 DATA 001,001,001,001,001,001,001,001,001
1127 DATA 001,001,001,001,001,001,001,008,000
```

```
1128 DATA 088,087,088,087,088,087,088,087
1129 DATA 088,087,088,087,088,087,088,087
1130 DATA 088,087,088,087,088,087,088,087
1131 DATA 088,087,088,087,088,087,088,087
1132 DATA 086,000,000,000,000,000,000,000,000
1133 DATA 000,000,000,000,000,000,000,000,000
1134 DATA 000,000,000,000,000,000,000,000,000
1135 DATA 000,000,000,000,000,000,000,000,085
1136 DATA 088,000,000,000,000,000,000,000,000
1137 DATA 000,000,000,000,000,000,000,000,000
1138 DATA 000,000,000,000,000,000,000,000,000
1139 DATA 000,000,000,000,000,000,000,000,087
1140 DATA 086,000,000,000,000,000,000,000,085
1141 DATA 086,000,000,085,086,000,000,000,085
1142 DATA 086,000,000,085,086,000,000,000,085
1143 DATA 086,000,000,085,086,000,000,000,085
1144 DATA 088,000,000,000,000,000,000,000,087
1145 DATA 088,000,000,087,088,000,000,000,087
1146 DATA 088,000,000,087,088,000,000,000,087
1147 DATA 088,000,000,087,088,000,000,000,087
1148 DATA 086,000,000,000,000,000,000,000,000
1149 DATA 000,000,000,000,000,000,000,000,000
1150 DATA 000,000,000,000,000,000,000,000,000
1151 DATA 000,072,073,000,000,000,000,000,085
1152 DATA 088,000,000,000,000,000,000,000,000
1153 DATA 000,000,000,000,000,000,000,000,000
1154 DATA 000,000,000,000,000,000,000,000,000
1155 DATA 000,074,075,000,000,000,000,000,087
1156 DATA 086,000,000,085,086,000,000,000,085
1157 DATA 086,000,000,085,086,000,000,000,085
1158 DATA 086,020,000,085,086,000,000,000,085
1159 DATA 086,000,000,085,086,000,000,000,085
1160 DATA 088,000,000,087,088,000,000,000,087
1161 DATA 088,000,000,087,088,000,000,000,087
1162 DATA 088,000,000,087,088,000,000,000,087
1163 DATA 088,000,000,087,088,000,000,000,087
1164 DATA 086,000,000,000,000,072,073,000,000
1165 DATA 000,000,000,000,000,000,000,000,000
1166 DATA 000,000,000,000,000,000,000,000,000
1167 DATA 000,000,000,000,081,082,000,000,085
1168 DATA 088,000,000,000,000,074,075,000,000
1169 DATA 000,000,000,000,000,000,000,000,000
1170 DATA 000,000,000,000,000,000,000,000,000
1171 DATA 000,000,000,083,084,000,000,000,087
1172 DATA 086,000,000,085,086,000,000,000,085
1173 DATA 086,000,000,085,086,000,000,000,085
1174 DATA 086,000,000,085,086,000,000,000,085
1175 DATA 086,000,000,085,086,000,000,000,085
1176 DATA 088,000,000,087,088,000,000,000,087
1177 DATA 088,020,000,087,088,000,000,000,087
1178 DATA 088,000,000,087,088,000,000,020,087
1179 DATA 088,000,000,087,088,000,000,000,087
1180 DATA 086,000,000,000,000,000,000,000,000
1181 DATA 000,000,000,000,000,000,000,000,000
1182 DATA 000,000,000,000,000,000,000,000,000
1183 DATA 000,000,000,000,000,000,000,000,085
1184 DATA 088,022,000,000,000,000,000,000,000
1185 DATA 000,000,000,000,000,000,000,000,000
1186 DATA 000,000,000,000,000,000,000,000,000
1187 DATA 000,000,000,000,000,000,000,021,087
1188 DATA 086,085,086,085,086,085,086,085
1189 DATA 086,085,086,085,086,085,086,085
1190 DATA 086,085,086,085,086,085,086,085
1191 DATA 086,085,085,085,086,085,086,085
1192 DATA 009,001,001,013,001,001,001,001,001
1193 DATA 001,001,001,013,001,001,001,001,001
1194 DATA 001,001,001,001,001,001,001,001,001
1195 DATA 013,001,001,001,001,001,001,001,010
1196 DATA 002,072,073,002,021,000,000,000,000
1197 DATA 000,000,023,002,023,000,000,000,000
1198 DATA 000,020,020,000,000,000,000,000,023
1199 DATA 005,000,000,000,000,077,078,002
```



## Colour Scroll

Adam Wright

This short routine for the C64 will enable you to fill the screen with series of scrolling horizontal coloured bands. The syntax for the command is SYS 49152.

```
0 REM COLOUR SCROLL
1 DATA 120,230,250,165,250,141,32,208,24
,105,1,141,33,208,160,0,162,0,232,224
2 DATA 160,208,251,200,192,1,208,244,240
,227
5 CS=49152:CK=0:FOR A=CS TO CS+29
6 READ D:POKE A,D:CK=CK+D:NEXT A
7 IF CK>4617 THEN PRINT "ERROR":STOP
8 U=CS+10:POKE U,1:SYS 49152
```

READY.

## Mouse

Darryn Lavery

This short routine in Atari ST Basic allows you to turn the mouse pointer on or off as you require.

The syntax is simply GOSUB MON or GOSUB MOFF.

```
10 REM MOUSE SWITCH BY DARRYN LAVERY
20 GOSUB MOFF:REM MOUSE OFF
30 END
1000 MON:POKE CONTRL,122:POKE CONTRL+2,0:POKE CONTRL+6,1
1010 POKE INTIN,0:VDISYS(1):RETURN
1020 MOFF:POKE CONTRL,123:POKE CONTRL+2,0:POKE CONTRL+6,0
1030 VDISYS(1):RETURN
```

## Extra Sound

Alan Crawford

One of the more powerful features of the Atari's Pokey sound chip is its ability to join two sound channels together to create one with a far greater frequency range. This is known as 16 bit sound as the frequency can be any 16-bit number (0-65535) instead of the 8 bit value (0-255) used in the normal SOUND command.

The routine is called using

DUMMY=USR(1536,VOICE,FREQUENCY,DISTORTION,VOLUME). DISTORTION and VOLUME are the same as those in the standard SOUND command. VOICE is either 0 or 1 and FREQUENCY is in the range 0-65535. 16 bit sound can be produced from Basic by poking better as it makes the changes to the resistors instantaneously.

```
10 REM 16 BIT SOUND
20 REM BY ALAN CRAWFORD
30 REM DUMMY=USR(1536,FREQUENCY,DISTORTION,NOISE)
40 FOR L=1536 TO 1592:READ D:POKE L,D:NEXT L
50 STOP
60 DATA 104,201,4,208,43,104,104,41,1,10,10,168,104,153,2,210
70 DATA 104,153,0,210,104,104,41,15,10,10,10,10,153,1,210,133
80 DATA 203,104,104,41,15,5,203,153,3,210,169,24,141,8,210,96
90 DATA 170,240,5,104,104,202,208,251,96
```

## Attention!

Unfortunately due to the sheer volume of submissions our returns department has been unable to cope satisfactorily. So, from now on we are requesting that you include a suitable stamped addressed envelope for return of your submission. Not enclosing a suitable SAE will mean that your program will not be returned. You have been warned.

The beneficial side of this system is that

90% of submissions will be returned within one week. A small price to pay for such a service I'm sure you'll agree.

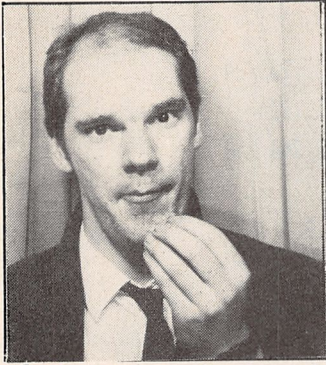
With regards to future submissions we are looking for articles on programming in general, utility programs and applications software and lastly, good games. Here are a few types of program we don't want: Educational, hangman, pools predictors, mastermind, flashing borders, bank ac-

counts, disc catalogues and clocks.

If you can't get a program listing in the magazine to work ring in to see whether it was faulty rather than writing. If there were problems then we'd let you know. Corrections normally appear a couple of weeks later. Thanks.

**Duncan Evans**  
Technical Editor





with Kenn Garroch

## External tape for CPC

Jonathan Davies, of Bishopston, Bristol, writes:

**Q** Following the recent demise of my CPC464's tape recorder, I thought that rather than get it repaired, I would attempt to connect up an external recorder. Looking inside the Amstrad's case, I found the connection between the tape deck and the circuit board, but there's no indication as to which lead is which. Any ideas?

One other thing: could you tell me exactly what the Z80 HALT instruction does, just out of interest?

**A** Not so easy this one. I had a look in my 664 and the following is the best I can do. I presume that the colours are the same, in any case, this is from left to right looking at the circuit board connection from the cassette end:

Red	Main power switch (to)
Black	Ground
White	Main power switch (from)
Blue	Don't know but I presume this is either signal in or out
Green	Connected to volume control so probably comes from the sound chip
Brown	Appears to be connected the same as white
Grey	Same comment as blue
Yellow	Motor relay control

Logically, there should be a signal in and a signal out (record and play) and I think these are on the blue or grey wires. The problem you will have is that the signal levels are almost certainly not the same as those used on a normal cassette recorder. The best thing to do is to try it and see - with care. Sorry I can't be of more help.

The Z80 HALT instruction stops the processor from executing any more instructions. The memory continues to be refreshed but no further instruc-

tions are executed until an interrupt or reset occurs. One use for the instruction would be to synchronise the processor with some external activity that causes an interrupt.

## Flying in from the USA

John Martin, of Nicosia, Cyprus, writes:

**Q** I am considering asking a friend of mine in the States to send me a program - *Flight Sim II* for my Amstrad PC. It's cheaper there, but it's for the IBM and produced by Microsoft.

My question is, will it run OK on my 512K Amstrad PC, or will I have wasted rather than saved money?

Also, could you tell me what the six extra screens available for this program are?

**A** As far as I know, the Amstrad PC is 99.99% compatible with the IBM PC and in this case, *Flight Sim II* will run - well worth the money it is as well. I think *Flight Sim II* is published by Sublogic; Microsoft produced *Flight Sim I*.

By extra screens, I think you must be referring to the extra scenery discs that are available. If my memory serves, the scenery that comes with the program is based around New York, Chicago, and Florida. The extra scenery discs provide the information that the computer needs to go to other places and airports, covering most of the USA.

## Recursion in Basic

Martin Jameson, of Glasgow, Scotland, writes:

**Q** Could you please explain what recursion is? I saw it mentioned in your article on Lisp but, not yet having a version of the language, I was wondering if it is possible to do it in Basic. If so, could you explain?

**A** The problem with most Basics is that they don't have local variables, and therefore don't stack them up in subroutine calls.

Recursion, in its simplest form, is a subroutine that calls itself, usually with different ar-

guments. Basic normally does all of its looping via FOR...NEXT or IF...THEN (or perhaps WHILE...WEND and REPEAT...UNTIL).

Generally, these methods are good enough for all occasions, especially since the language is based around them. However, recursion is a neat and sophisticated programming method that is sometimes easier to use.

Recursion works by keeping all of the variables related to a level, local to that level, eg,

```
10 a=10
20 gosub 100
100 if A=0 then return
110 A=A-1
120 gosub 100
```

Here, A starts off with the value 10 which then has one subtracted to give 9 which is used as the argument for the next *gosub*. In the top level, A=10, the second, A=9, the third, A=8, etc. However, when A reaches 0, the recursion unwinds and A should have the values assigned to it at each *gosub*, ie, 0 1 2 3 4 5 6 7 8 9 10. Since A is not local and therefore not stored for each *gosub*, the recursion does not work, A remains zero all the way back up, ie, at every return.

Two subroutines are needed to get around this and to store the values needed at each level. The stack is an array (of the type needed to store the variable) and starts out with a pointer, *pnt*, giving the next available space in it (first of all *pnt=0*). To put something on the stack, *stk(pnt)=variable* is used, and *pnt=pnt+1* so that the pointer always gives the next available space.

Popping something off the stack requires the opposite process, ie, reduce the stack pointer by one, and then get the value at that location.

To show this working, try the program Prog 1 below.

Prog 1

```
10 DIM stk(100)
20 pnt=0
30 b=5
40 GOSUB 70 :REM recur
50 PRINT b;
60 END
70 REM recur: the subroutine
75 print b;
80 IF b=0 THEN RETURN
90 a=b:GOSUB 150: REM push
100 b=b-1
```

```
110 GOSUB 70 : REM recur
120 GOSUB 190 :REM pop
130 print b
140 RETURN
150 REM push:
160 stk(pnt)=a
170 pnt=pnt+1
180 RETURN
190 REM pop:
200 pnt=pnt-1
210 a=stk(pnt)
220 RETURN
```

This prints the value of b at each level, and gives the result:

5 4 3 2 1 0 0 1 2 3 4 5

So, as the subroutine calls itself, the value of b is being saved on the stack with push on the way in, and is then recalled via the pop routine on the way out.

An example of recursion is shown in Prog 2 and evaluates the factorial of 5 ( $5*4*3*2=120$ ).

One thing that may cause problems on some micros is the size of the *gosub* stack.

This is an internal stack that is used to maintain control over

Prog 2

```
10 DIM stk(100)
20 pnt=0
30 b=10
40 GOSUB 70 :REM recur
50 PRINT b
60 END
70 REM recur:
80 IF b=1 THEN RETURN
90 a=b:GOSUB 150: REM push
100 b=b-1
110 GOSUB 70 : REM recur
120 GOSUB 190 :REM pop
130 b=b*a
140 RETURN
150 REM push:
160 stk(pnt)=a
170 pnt=pnt+1
180 RETURN
190 REM pop:
200 pnt=pnt-1
210 a=stk(pnt)
220 RETURN
```

subroutines and their return positions.

Some Basics only have a limited stack space available for this and cause problems when trying to perform recursion since a subroutine can only call itself a limited number of times.



## The ST on television

P Godley, of Worksop, Notts, writes:

**Q** I am probably one of many currently considering buying an Atari 520 STFM after the announced price cuts.

There are, however, a few points on which I am still unsure. Would my Toshiba HXP550 printer be compatible with the ST? Its cable is an 8 bit parallel interface, according to the manual.

I understand that some of the ST software currently available can only run with a colour monitor.

If I were to use a normal colour TV, would this in any way restrict the range of software I could use? I accept that the picture quality would not be as good.

Is it possible for the ST to run any of the disc software currently marketed for the other Atari 8-bit machines?

**A** There is a good chance that you will be able to use the printer with the ST. An 8-bit parallel interface almost always refers to the Centronics standard. The ST is Centronics compatible, so you should have no trouble (apart from making up the cable).

The output from the modulator is the same as the low and medium resolution screen modes. The high res monochrome is the only picture you will not be able to get on the colour TV or monitor. Pretty well all software for the ST is in either low or medium resolution, so you will be able to see it on your colour TV.

There are a few applications that are high res only, they are, however, quite rare and usually highly specialised.

To run Atari 8-bit software on the ST, you would first of all need to be able to read the discs, and secondly have an 8-bit emulator. As far as I know, neither of these things are possible - as yet.

## Cheese-tasting session

Paul Brokee, of Richmond, N Yorks, writes:

**Q** I purchased a mouse and Cheese package for use with the Com-

modore 64. I designed quite a few pictures which are saved on tape. The Cheese program will load them in again but I would like to be able to use them in my own programs, ie, load pictures without the Cheese program. Do you know a way of doing this?

**A** The short answer is, unfortunately, no. However, the following explanation of the 64's screen workings may help you find how and where the picture is loaded into memory. Once you know this, you can write a program to decode any pictures you have drawn.

The C64 has two graphics modes, high res and multi-colour; which one the mouse and Cheese is using, I don't know. However, if there are a lot of colours in the picture, it is multi-colour. This is likely since it is the best and most commonly used graphics mode.

The Vic chip in the 64, the device that controls the graphics, allows screens to be placed in different areas of memory, and a multi-colour screen consists of three areas. The colour Ram starts at 55296, then the main colour area whose start depends on the Vic setting, and the bitmap area where, again, the position depends on the Vic chip. The last two areas are positioned in the current bank by the Vic, and the bank is selected by the lowest two bits in 56576.

The addresses of the bitmap and the main colour area are found as shown below.

From this you can see that the four banks are: 0-16383, 16384-32767, 32768-49151, 49152-65535.

The thing to notice about B0 and B1 is that they are inverted.

### Main colour

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
B1	B0	V13	V12	V11	V10	0	0	0	0	0	0	0	0	0	0

### Bitmap

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
B1	B0	B13	B12	B11	0	0	0	0	0	0	0	0	0	0	0

### Where:

	7	6	5	4	3	2	1	0	
53272	V13	V12	V11	V10	B13	B12	B11	1	(last bit always 1)
56576	x	x	x	x	x	x	B1	B0	(these are inverted 1=0, 0=1)

For instance, poking 56576 with 1 gives the bank from 32768-49152, and poking with 0 gives 49152-65535.

Once B0 and B1 are set, the position of the bitmap and the colour area can be set. The bitmap can occupy any of eight

positions within the bank, the bank base address plus 2K increments, ie, for bank 2 (16384-32767) it can start at 16384, 18432, 20480, 22528, 24576, 26624, 28672 or 30720. However, since it is 8K bytes long, only a couple of these are really feasible.

The main colour area can start at the bank base address plus 1K increments giving 16 positions. The problem is that both the colour area and the bitmap have to be within the same bank, and it is better if they don't overlap.

So, feasible positions in, say, bank two are 24576 for the bitmap and 23552 for the colour area. Alternatively, 16384 for the bitmap and 24576 of the colour area. There are other possibilities, it's just a matter of moving things around.

OK, now we get to finding the picture. The first thing to do is to find the load address of the screen.

Presumably the mouse and Cheese package stores the pictures as separate files, each with its own header.

The header is at the start of the file, and tells the computer such things as the load address and end address plus the file type.

The load address is what we are interested in. So, put in a tape with a picture file on it, type OPEN 1 and press return. This will read the header into the cassette buffer starting at 828. When control returns to the 64 keyboard, type

```
?PEEK(829)+256*PEEK(830)
```

(Note 1st byte is file type, 2/3 start address, 3/5 end address)

This is the start address and should give you an idea of which bank the picture is going to be loaded into. The address

the largest, it makes sense not to have to move it around in memory. Therefore, it is logical to put it as the first part of the file.

Note that if this is not the case then things are a lot harder. The following program should find the picture for you:

```
5 POKE 53265, PEEK(53265) OR 32:REM
SET BITMAP MODE 6 PEEK 53270,
PEEK(53270) OR 16:REM SET MUL COL
MODE
10 GET A$
20 IF A$="B" THEN BN=BN+1:POKE
56576,(PEEK(56576) AND 252) OR BN
25 REM STEP THROUGH BANKS
30 IF A$="M" THEN BM=BM+2:POKE
53272,PEEK(53272) AND 241) OR BM
35 REM STEP THROUGH BITMAPS
40 IF BN=3 THEN BN=-1
50 IF BM=14 THEN BM=-2
60 IF A$="Z" THEN BM=0:BN=0
70 GOTO 10
```

What the program does is allow you to move the bank and bitmap addresses around until you see some kind of picture on the screen.

Load the picture, then run this program. You will have a good idea of which bank to look in from the header information. Step through the various bitmaps until you can see some resemblance to your picture (make it a simple one with not too many colours).

Pressing Run/Stop Restore and examining BM and BN tells you the bank and position of the bitmap. The length of the bitmap is 8000 bytes, so the next 1000 contain either the main colour area or the Ram colour.

Set up the Ram colour area to somewhere convenient in the bank and copy the next 1000 bytes into it (a simple for next loop peeking and poking) then the next 1000 bytes to the colour Ram area. Then set up the bank, modes, and base address registers and see if the picture is correct. If the colours are wrong, swap the colour areas over and try again.

It may be that one of *Popular's* readers already knows the answer in which case, they could be really kind and send it to me.

## Horizontal routines

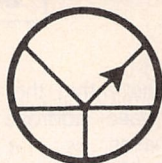
A Denby, of Alcester, Warks, writes:

**Q** I am writing a machine code for my Atari ST and I want to put it into a cartridge. My first problem is that nobody seems to be  
continued on page 35 ►





The leading North West  
Specialist ATARI Dealer



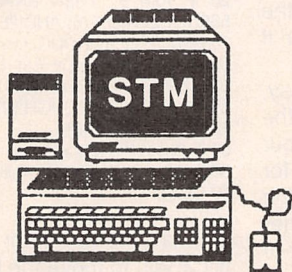
**ADBROKE  
COMPUTING**  
INTERNATIONAL

33, Ormskirk Road  
Preston, Lancs.  
Tel: (0772) 21474  
Mail Order: 27236 or  
Bul/Board 6pm to 9am

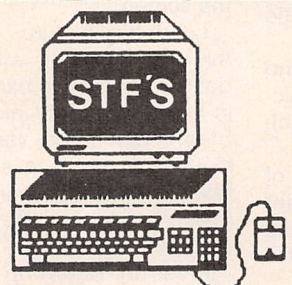


This Company has given years of full support to ATARI users Countrywide from their retail shop premises at Ormskirk Road, Preston. Now from their NEW Mail Order Depot they can offer the same Excellent service to all Mail Order Customers.

All Software and Hardware is fully tested prior to selling. This ensures Customers receive working items so that returned goods, and all the attendant frustration are a thing of the past. All Hardware is supported by our own 'ON SITE' engineers, therefore quick turn round on all repairs is Guaranteed. All prices quoted are fully VAT inc. and there are no 'hidden extras', what you see is what you get. Prices include delivery. Items despatched same day. Ring for latest price changes.



520STM Packages.....PHONE



1040STF+Mouse  
+Softwr.....£480.00  
1040STF+Mouse  
+Hi-Res Mon  
+Softwr.....£580.00  
1040STF+Mouse  
+Colour Mon  
+Softwr.....£780.00

1Meg Upgrades are available for the 520STM. These are our own design and are very simple to fit. Using the same board, all ST's can be Upgraded to 2mg or 4mg. So no need to sell your 520 just Upgrade to a Mega ST using our board.

1Meg Upgrade (STFM).....£70.00  
1Meg Upgrade (All ST's).....£135.00  
2.5Meg Upgrade +Board.....PHONE  
4Meg Upgrade +Board.....PHONE

If any of the above Upgrades are purchased with Hardware then deduct £5 from total.

#### PRINTERS

Dot Matrix  
Star NL10..... £230.00  
NL10 Sheetfeeder.....£55.00  
National Panasonic.....PHONE  
MP165.....PHONE  
MP135.....PHONE  
LX86 Tractor Feed.....£19.00  
LX86 Sheetfeeder.....£55.00  
LQ800 24pin D/M.....£525.00  
All Others.....PHONE



	3 1/2 D/S D/D	5 1/4 D/S D/D 46TPI
Per Disk .....	£1.99	£0.80
10 Disks .....	£16.00	£6.50
10 Disks+Plastic lib case ...	£17.50	£7.50
100 Disks +Cases ..	£150.00	£60.00
500 Disks +Cases ..	£650.00	£280.00

All Disks are covered by an unconditional lifetime guarantee.



We also stock a full range of quality P/D ST Software at £3.99 per Disk Send SAE for catalogue.



Our ATARI trained engineers will repair all Hardware in minimum time at competitive rates. Please ring for a quotation. All repairs carry a 90 day warranty.

#### NEWLY IMPORTED

Imager. Easily fixed to your printer it will digitise anything placed in the printer and save to Disk to be used with Dega, Elite etc. RRP £99.99.

All Printers, Disk Drives etc supplied with cables etc. NO HIDDEN EXTRAS

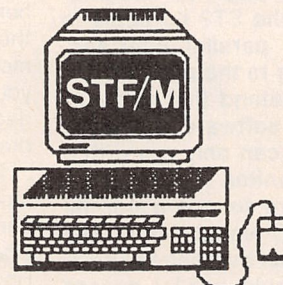
Mega ST's .....PHONE  
Laser Printers .....PHONE  
PC Clones .....PHONE

#### DUST COVERS

Computers.....£3.99  
Monitors.....£4.99  
Disk Drives .....£2.99  
Printers.....£7.99

IF IT'S AVAILABLE we have it!  
Send SAE for full catalogue.

All Dedicated books and mags in stock



520STFM+Mouse  
+Softwr.....£285.00  
520STFM+Mouse  
+Softwr  
+1Meg Upgrade.....£350.00  
520STFM Mega Pack  
520STFM+Mouse  
+Softwr  
+1Meg Upgrade  
+1Meg 2nd Drive .....£485.00  
Equal to 1040STF+1/2Meg Drive  
+Modulator

For Med Res Col Mon add.....£299.00  
For High Res Mono Mon add....£129.00

All Hardware is covered for 12 months by our service dept. and is tested prior to delivery to assure satisfaction.



We have a complete range of Software in stock and fully tested.

We also stock a full range of ATARI 8Bit Hardware and Software including the new XE range. Please ring for prices

#### PERIPHERALS

Triangle 1mg D/Drive .....£139.00  
Triangle 2x1mg D/Drive .....£229.00  
Pro Draw Graphics Tab'.....£310.00  
Cumana 1Meg D/Drive .....£139.00  
All Drives come complete with Software

#### HARD DRIVES

Atari 20mg .....£550.00  
Triangle 20mg Hard Disk .....£669.00  
Supra 20mg.....£550.00  
30mg.....PHONE  
60mg.....PHONE

Any Software problems? Queries? give us a ring we usually have the answer

TO ORDER Simply send, or phone your order, stating Full Name, Address, Visa or Access Nos, Cheque or Money order. Make payable to Ladbroke Computing International, 33, Ormskirk Road, Preston, Lancs. PR1 2QP.

FOR MORE INFO CALL ON THE ABOVE NUMBERS OR SEND SAE AND STATE FULL REQUIREMENTS



# PEEK & POKE

◀ continued from page 33

**vertise Eprom programmers for the ST, any ideas why not? Is it possible to connect a sideways Ram like the BBC to the ST's cartridge port? If it is, could you please explain how it is done?**

**Another problem I have encountered is trying to patch a routine of my own into the horizontal blank interrupt. Could you please explain how this is done?**

**A** The most probable reason why no one has produced an Eprom programmer for the ST is that the machine is still relatively new. No one has decided that the machine needs one, after all, there is at least 512K of Ram to use up before extra programs need to be stored on a cartridge.

However, it is obviously possible to attach some kind of programmer but not to the cartridge port (see later), all that is needed is a little know-how. Wait a while, someone will start producing one eventually.

Similar arguments apply to the sideways Ram idea although, since the 68000 micro-processor has an address range of 2<sup>24</sup> or 16,777,216 bytes there seems to be little need of a sideways Ram. What is needed is additional Ram and the ST is upgradable to at least 2M bytes (2,097,152 bytes) which is a lot (see the Mega STs). You can't, easily, attach Ram in the cartridge port because there is no memory write line available, although Roms are all right since they are read only.

OK, after the above failure, here is something I can help with, the horizontal blank interrupt. This is easily accessed by simply redirecting the level two interrupt vector at \$68. Normally this points to a routine which turns the interrupt off, ie,

```
hbl  move  d0,-(sp)
      move  2(sp),d0
      and   #$700,d0
      bne   #hblnz
      or     #$300,2(sp)
hblnz move  (sp)+,d0
      rte
```

To make sense of this, the interrupt structure of the ST must be explained. The 68000 has seven interrupt levels and the higher the number, the higher the priority, ie, level six is able to interrupt level four but not vice versa.

The ST only uses three of

these, 2 (HBL), 4 (VBL), and 6 (MFP 68901) and as you can see, the horizontal blank interrupt has the lowest priority. Level seven is non-maskable but is not used in the ST so, all interrupts can be disabled by setting all the interrupt bits in the status register.

The bits in question require supervisor status and are bits 8, 9 and 10 of the status register (0-7<sub>10</sub> in the low byte). Neither the VBL (Vertical Blank) or the MFP 68901 (Multifunction processor) vectors should be diverted since they generally cause a crash, and in any case, there are better ways of accessing these.

The HBL, on the other hand, can simply be redirected by putting the address of the new routine in the correct position in the interrupt vector table (memory location \$68).

Again, this will require supervisor status since it is in a reserved location.

The following program shows the HBL routine set up to change the screen colour palette O. A couple of things to notice are that the result is not stable, and moving the mouse causes problems. The reason for the first I am not too sure about. It appears to be something to do with the HBL not being tied into the VBL so it never knows where the top of the screen is. I have tried to stabilise by synchronising with the VBL but, although the picture steadies a little, it is still very wobbly.

The reason for the mouse causing problems is that the keyboard interrupt comes through the MFP, and therefore interrupts the HBL routines, it being of higher priority.

If you want to synchronise a HBL routine with the display, the best thing is not to use the HBL interrupt at all. The MFP has a register that counts the number of horizontal blanks, this can be used (in colour modes anyway) to achieve split screen effects. It is also a lot more stable when used in conjunction with the VBL to note the top of the screen.

The MFP timer in question is B at interrupt MFP int level 8. Look at *xbios* calls 26, 27, 31 and 13. There will also be a fuller discussion on this subject in the September issue of our sister publication *ST Update*. If you are still struggling, write and tell me what you are trying to do, and I'll see whether I can help.

START	MOVE.L	A7,A5	Standard header
	MOVE.L	*USTK,A7	Set up local stack
	MOVE.L	4(A5),A5	Base page address
	MOVE.L	\$(A5),D0	
	ADD.L	\$14(A5),D0	
	ADD.L	\$14(A5),D0	
	ADD.L	*\$100,D0	Skip base page
	MOVE.L	D0,-(SP)	
	MOVE.L	A5,-(SP)	
	MOVE.W	D0,-(SP)	
	MOVE.W	*\$4A,-(SP)	
	TRAP	#1	
	ADD.L	#12,SP	
	BSR	GO	
	MOVE.L	*0,-(SP)	
	TRAP	#1	
GO	bsr	sethbl	Set up HBL interrupt
	bsr	wkey	Wait for a keypress
	bsr	rsthbl	Turn interrupt off
	rts		
sethbl	bsr	super	Super mode
	move	sr,d0	Get the status register
	or	*\$7,d0	Set no interrupts
	move	d0,sr	
	move.l	\$68,hbpt	Save old vector
	move.l	*hbl,\$68	Set new
	move	sr,d0	
	and	*\$F8FF,d0	Set int level to 0
	move	d0,sr	Put back
	bsr	usuper	back to user mode
	rts		
rsthbl	bsr	super	
	move	sr,d0	Get the status register
	or	*\$7,d0	Set no interrupts
	move	d0,sr	
	move.l	hbpt,\$68	Reset old vector
	move	sr,d0	
	and	*\$F8FF,d0	Set int level to 0
	move	d0,sr	Put back
	bsr	usuper	back to user mode
	rts		
hbpt	ds.l	1	Save pos for old hbl vector
* This is the HBL routine itself - it is an interrupt and hence an exception so use RTE *			
hbl	subq	#1,cnt	Delay before doing anything
	beq	hblg	Until zero - go
	rte		Else return - this is exception return
hblg	move.l	a0,-(sp)	Save A0 since it's corrupted by routine
	move	#100,cnt	Reset counter
	lea.l	\$\$F8240,a0	Address of palette 0
	eor	#1,(a0)	Flip colour
	move.l	(sp)+,a0	Get A0 back
	rte		End exception
cnt	dc.b	100	Counter
super	clr.l	-(sp)	
	move	*\$20,-(sp)	:Go into supervisor mode
	trap	#1	
	addq.l	*6,sp	
	move.l	d0,stkve	
	rts		
stkve	ds.l	1	
usuper	move.l	stkve,-(sp)	:Go into user mode
	move	*\$20,-(sp)	
	trap	#1	
	addq.l	*6,sp	
	rts		
wkey	move	*\$FF,-(sp)	:Wait for a keypress
	move	*6,-(sp)	
	trap	#1	
	addq.l	*4,sp	
	beq	wkey	
	rts		
USTK	DS.L	256	
	DS.L	1	User stack of 256 longs
	EVEN		
	END		



# Getting started in communications

Take a computer, plug in a modem and telephone line and you've got access to the world of computer communications. Here, Steve Gold takes readers through the basics of modems, baud rates and the rest of the jargon.

Judging from the myriad computer communications articles that appear in magazines such as *Popular Computing Weekly*, you'd think that linking your computer to a modem and phone line was the easiest thing in the world – as simple as popping a disc into a drive, in fact.

Sadly, many potential enthusiasts are put off by the jargon involved, which is – in common with many computing activities – shrouded in mystique.

Ten years ago, when modems first began to appear, they were a mystery for the great majority of computer users. With the advent of low-cost technology however, computer communications has been transformed from an expensive elitist hobby into a sport for the computer masses. Latest estimates say that one in 20 computer owners has access to – either at home, work or school – a computer modem.

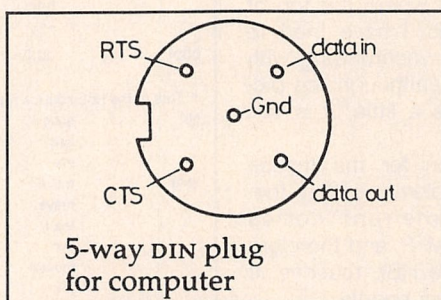
## The modem

Most computer users will be familiar with the printer port on their computer. This is called a parallel port, since 8-bit computer data is fed through eight separate wires – in parallel – so that each byte (eight bits) of data arrives at the printer at the same time.

The serial port – so called because data

is fed serially, one bit after another – is perhaps less familiar. Unlike the parallel port on a computer, most computer serial ports can cope with data travelling in both directions at once.

At its most basic, a serial port – as found on the BBC micro – is a five pin array. One pin serves as a signal ground, one as a transmit wire, one as a receive wire, and two control circuits – one each for the transmit receive wires – completing the picture.



On many computers however, a 25-way D-type connector – as shown in diagram one is fitted. Don't be discouraged by so many connections, it's simply that the RS232 standard – because it is a standard

– has to accommodate several different types of wires to and from a variety of computers, and their associated devices (printers, modems, etc).

Most computers today can be made to communicate with others if their serial port is connected to a modem, which is then connected to a telephone line.

The word modem may sound vaguely foreign, but it originates from the US (like most things computerate do) and actually stands for MODulator – DEModulator.

## What is a modem?

A modem is a device that converts digital data into analogue signals for transmission over telephone lines, and that converts the received analogue signals back into digital data. Its name is derived from these two functions of modulation and demodulation. Modems are used to connect computers and computer terminals to telephone lines so that they can transmit data to one another at a distance.

Digital data from a computer terminal, in the form of a sequence of bits, is fed to a modem. The modem converts the bits into an analogue signal that preserves the distinction between the low and high bits; for example, the bits may be converted into two frequencies such as 1,200Hz and 2,200Hz.

At the receiving end, another modem detects the two frequencies and produces a digital signal that is essentially identical to the original digital signal. The computer may be unable to distinguish whether it is directly connected to a terminal or connected by telephone line.

If the terminal and the computer can send data to one another, the modems are operating in full duplex mode. If only one of them can send data at any given time, the mode is called half duplex.

All set up: modem, computer and telephone



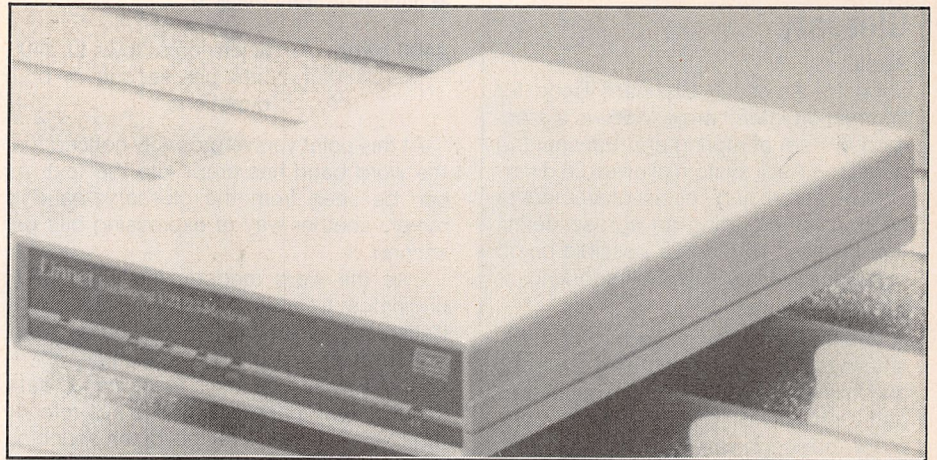
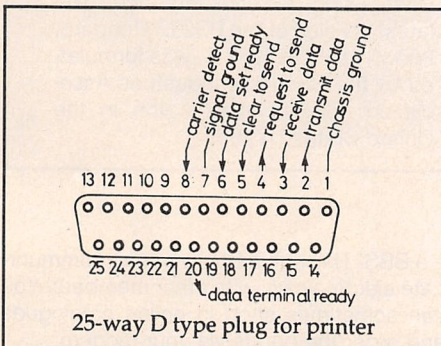


As well as a modem, computers also need suitable communications software – sometimes called 'terminal software' – to allow data going in and out via the serial port to be displayed on screen, saved to disc and/or tape, as well as being dumped to a printer (if fitted).

A modem can cost as little as £20. Some services, such as Micronet on Prestel, will even give you a modem if you contract to use (and pay) for the service for a year. The cost of the modem is, of course, a sweetener to get you to sign on the dotted line. For some users, however, the offer of a free modem may well be worth the trouble of signing a contract.

## How a modem works

In its simplest form, a modem takes the serial data that is squirted down the RS232 interface link and converts it into a series of



The Pace Linnet – intelligent modem at a reasonable price

data blips that can be carried over a telephone or similar audio circuit.

Unlike a telephone microphone, which converts audible sound into electrical energy, a modem does the exact opposite and converts electrical energy into audible sounds – just like a loudspeaker in a radio, TV or telephone earpiece in fact.

But there the similarity ends as, unlike a loudspeaker circuit, a modem only has to process a very simple stream of data into a series of simple tones.

## Different speeds

As you've probably guessed, modems can operate at different speeds, ranging from

300 bits per second right up to 19,200 bits per second and beyond. Most modems in the UK today work at one of four different speeds:

**300 baud** – where both the send and receive channels process data at 300 bits per second.

**1200/75 baud** – where one channel operates at 1200 bits per second, and the other at 75 bits per second.

**1200 baud** – where data flows at 1200 bits per second in both directions.

continued on page 38 ►

## SPECTRUM SUMMER SALE

£1.99 EACH

Wintersports, Who Dares Wins II, Adrian Mole, Stainless Steel, Ballblazer, Sherlock, Hurg, Gerry The Germ, Rasputin, Costa Capers, Runestone, Equinox, Cop Out, American Football, City Slicker, Revolution, Valhalla, Valkyrie 17, Amazon Women, Young Ones, Battle Of The Planets, Rescue On Fractalus, Sir Lancelot, Surf Champ, Mugsy, Firelord, Matabolis, Riders Den, Chimera, Frost Byte, Spider Man Hulk, Pitfall II, Zorro, Bounder, Adventure Land Secret Mission, Sam Stote Safebreaker, 3 Weeks In Paradise, Contact Sam Cruise, Starbike, Chicken Chase, Toy Bizzare, Realm Of Impossibility, Mantronix, Nomad, I Of The Mask, Night Gunner, Zoids, Super Sleuth, Jet Set Willy II, Virgin Atlantic Challenge, Chuckie Egg II, Red Arrows, Pole Position, Galaxian, Super Chess 3.5, Mugsy's Revenge, Ghostbusters, Skool Daze, BCs Quest For Tires, Fighting Warrior, Rocco, Hot Shots Compilation, Willy Wobbler, Hacker, Visions Snooker, Xcel, Brian Jacks Superstars, Robin Of Sherlock.

£2.99 EACH

Superbowl, Dragon's Lair, Sold A Million, Vectron 3D, Pac-Man, Future Knight, Avenger, Crystal Castles, Masters Of The Universe Arcade, Prodigy, Tarzan, War, Xevious, Pentagram, Football Manager, Evil Crown, Pyracurse, Impossaball, Tapper, Trail Blazer, Kayleth, Rebel Planet, Jet Pac, Fighter Pilot, Butch Hard Guy, Icups, Martianoids, Return To Oz, Monty On The Run, War, Uridium, Hive, Southern Bell, Arc Of Ye Sod, Legend Of Kage, Druid, Astro Clone, Way Of The Tiger, Terra Cresta, Uchi-Mata, The Comet Game, Dandy, Krakout, Infiltrator, Back To The Future, Heartland, Sorderons Shadow, Tempest, Zor O, Hi Jack, The Eidolon, Explorer, Koronis Rift, Kinetik.

COMPILATION TAPES £2.99

Star Games I, Unbelievable Uimate, Scot Adams Scoops.

## 48K SPECTRUM ROTRONICS WAFADRIVE

★★★★★★★★★★★★

FANTASTIC SAVINGS ONLY

☆ £14.99 ☆

+ £2.50 p+p

Inc. 1 64K Wafer

★★★★★★★★★★★★

RS232 Lead ..... £10.50  
Centronics Lead ..... £10.50  
Currah Microslot ..... £2.95  
Spectrum ..... £25.00  
5 Rolls of Alphacom/Timex paper ..... £10.95

p&p 1-3 titles 85p

3 or more £1.00

Overseas £1.20 per tape  
CHEQUES PAYABLE TO

LOGIC SALES LTD

17 Leofric Square, Eastern Industry,  
Peterborough, Cambs. Tel: 0733 313870

New York's Scum  
Are About To Take Over





## Glossary

### Ascii

Short for American Standard Code for Information Interchange, Ascii is a standard system of storing and transmitting data. The Ascii system allows 128 different characters and special characters to be transmitted using an agreed definition for each of the 128 possible on-off combinations in a seven-bit sequence.

### Asynchronous

A method of transmitting data characters that are preceded with start bits and followed by stop bits. These start and stop bits allow the receiving computer to recognise each character as a separate character when it arrives.

### Baud

Baud is a means of expressing the transmission of data. Often used interchangeably with 'bits per second'. 300 baud – a very common speed for modems – is roughly equal to 300 bits per second. 300bps is approximately equal to 30 characters per second.

### Demodulator

An electronic device that takes a modulated signal – usually from telephone circuits – and converts it into binary signals, suitable for feeding into a computer. A modem has a demodulator in it (as well as a modulator).

### Error checking

Usually part of a process of transmitting data from one computer to another. Error checking ensures that the data received is the same as data sent. There are several different techniques of error-checking used in communications.

### File transfer

Describes the act of sending a computer file from one computer to another, usually over a modem to modem link.

### Network

A communications system for computers. Networks allow data to travel between computers. The telephone system is an example of a network – in this case it is the Public Switched Telephone Network (PSTN).

### Synchronous

A method of transmitting data that employs synchronisation characters sent at the beginning of a message. If Ascii characters are being sent, each seven bits subsequent to a synchronous character is recognised as a letter, number or similar character. Machines must be synchronised so that there is no disagreement as to where one character ends and another one starts.

### Terminal

A device that connects with a computer, allowing someone to send and receive data using a keyboard. In the early days of computer communications there were two types of terminals – printing and visual display (VDU). Terminals have largely given way to computers running terminal emulation software.

◀ continued from page 37

**2400 baud** – where data flows at 2400 bits per second in both directions.

At this point you've probably noticed that the word baud has crept into the text. As can be seen from the glossary, baud is merely another way of expressing bits per second.

Like the word modem, the word baud originates from the United States. Early British modem users, on the other hand, preferred to use bits per second – shortened to bps – as their measure of data speed. Many reference books still refer to 'bps' in preference to the brash-sounding baud!

## Using a modem

Like most computer peripherals, a modem works as an adjunct to the computer itself. In most cases, even after a computer has been equipped for communications, its work applications remain the same.

Thus, even whilst the modem is connected to the serial port of your micro, it remains inert until suitable software is loaded in and run. This saves having to plug the modem in and set it up each time you want to use it.

Imagine your computer at home. If it's used for entertainment (and educational) purposes, without a modem and communications software it's limited to the use of those programs that you happen to have in your personal collection.

When connected through the telephone line to other computers however, you have access to all the electronic games and other programs on the other computers as well . . . as much wider choice.

By sending messages through the modem and down the phone line, you can join a club that operates a remote bulletin board



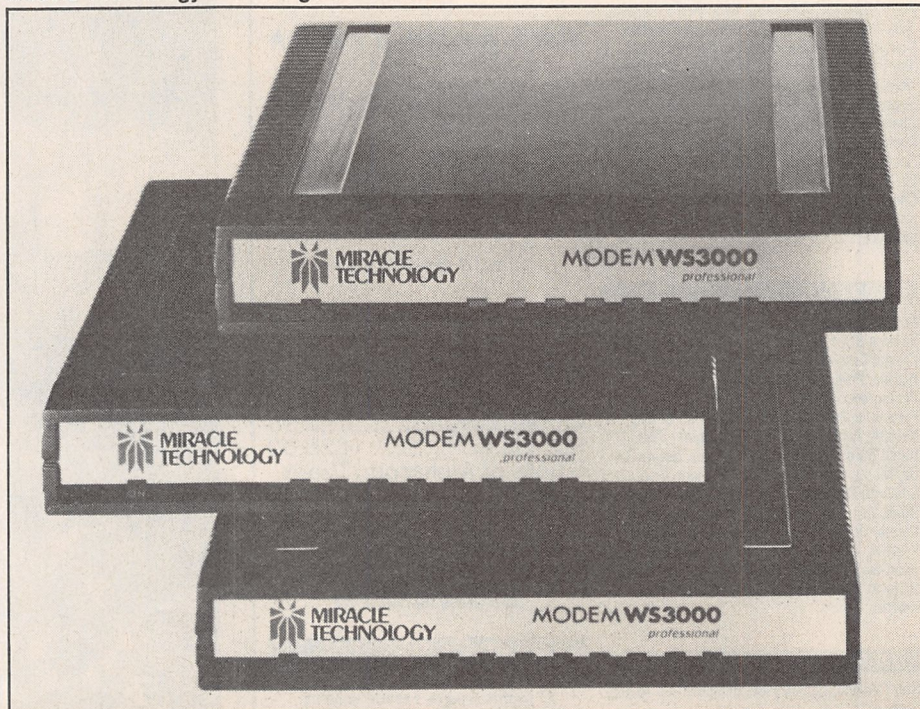
## The RS232 standard

The RS232 interface is a standard for connecting business machines (including computers) with other devices using a serial interface. The latest revision of the RS232 standard, known as the RS232-C, was formulated by the Electronic Industries Association (EIA) of Washington in the United States, in 1969.

– a BBS. Through a BBS you can communicate electronically with other members. You can sometimes shop in online catalogues and order the goods via your modem.

I hope you've enjoyed this brief summary and introduction to modems and computer communications. Perhaps those readers of *Popular Computing Weekly* who are already experienced in the world of computer communications will also have gleaned a few facts they may have missed in what is an exciting extension of a home and small business microcomputer's capabilities.

## Miracle Technology's WS range of modems





## ADVERTISEMENTS

Popular Computing Weekly is happy to accept advertisements which require our own production and typesetting. Although every advertisement is carefully checked during production, occasionally typographical errors do occur in publication.

We therefore ask advertisers to assist us by checking their advertisements carefully, after publication, and advise us immediately should an error occur.

We regret that we cannot be held responsible for more than ONE incorrect insertion and that no republication will be granted in the case of typographical or minor changes which do not affect the purpose of the advertisement.

**POPULAR COMPUTING WEEKLY**

**FORGET  
WIRE-FRAME 3D.  
FREESCAPE™  
IS SOLID!**



COMMERCIAL AND COMPUTER SERVICES LIMITED 01 549 3028

<b>Amiga Titles</b>		<b>Leaderboard</b> .....	20.00	<b>Colourspace</b> .....	18.00
Bureaucracy.....	29.00	Leaderboard Tourn.....	20.00	Cards.....	18.00
Golf.....	29.00	Mean 18.....	24.00	Electronic Pool.....	18.00
Hacker.....	20.00	Super Huey.....	15.00	Flippers.....	18.00
Portal.....	24.00	Apsahi Trilogy.....	20.00	Goldrunner.....	20.00
Shanghai.....	20.00	World Games.....	20.00	Karate Kid II.....	20.00
Tass Times.....	20.00	Anco Games.....	10.00	Lands Of Havoc.....	18.00
Witness.....	25.00			Major Motion.....	18.00
7 Cities Of Gold.....	25.00	<b>Atari ST</b>		Mud Pies.....	18.00
Archon 2.....	25.00	<b>Hardware</b>		Pinball Factory.....	20.00
Adventure Conts. Set.....	25.00	520 STFM.....	275.00	Super Conductor.....	35.00
Arctic Fox.....	25.00	520 STFM + Colour.....	565.00	Time Bandits.....	25.00
Marble Madness.....	25.00	1040 ST.....	475.00	Trivia Challenge.....	15.00
One To One.....	25.00	1040 STF + Mouse.....	800.00	Silent Service.....	20.00
Skyfox.....	25.00	Hard Disk (SH204).....	685.00	Crusade In Europe.....	20.00
The Pawn.....	20.00	Mono Monitor.....	135.00	F15 Strike Eagle.....	12.00
Guid Of Thieves.....	20.00			Ultima III.....	20.00
Faery Tale Adventure.....	39.00	<b>Commodore</b>		Balance Of Power.....	25.00
Borrowed Time.....	20.00	<b>Amiga Hardware</b>		Black Cauldron.....	30.00
Ballyhoo.....	24.00	Amiga 500.....	499.00	Kings Quest 2.....	30.00
Cut Throats.....	24.00	Colour Monitor.....	399.00	SDI.....	35.00
Deadline.....	24.00	External Drive.....	249.00	Hades Nebula.....	18.00
Enchanter.....	24.00	Amiga 2000.....	1150.00	Mercenary.....	20.00
THHGTS.....	24.00			Arkanoid.....	12.00
Infidel.....	24.00	<b>3.5" Discs</b>		Chess.....	20.00
Leather Goddesses.....	24.00	Single Sided (White).....	99p each	Football Fortunes.....	20.00
Mindshadow.....	20.00	Double Sided (Blue).....	145p each	Golden Path.....	20.00
AMFV.....	27.00			Arena/Brattacus.....	30.00
Moon Mist.....	24.00	<b>Atari ST Titles</b>		Deep Space.....	30.00
Music Studio.....	29.00	GLF Football.....	20.00	Jewels Of Darkness.....	20.00
Planetfall.....	24.00	Macadam Bumper.....	17.00	Guid Of Thieves.....	20.00
Seastalker.....	24.00	Art Director.....	42.00	The Pawn.....	20.00
Sorcerer.....	24.00	Film Director.....	50.00	Games Compendium.....	20.00
Spellbreaker.....	24.00	Fier St. Publisher.....	100.00	Check Mate.....	12.00
Starcross.....	24.00	Borrowed Time.....	20.00	Terrestrial Encounter.....	12.00
Suspect.....	24.00	Basketball.....	20.00	Liberator.....	10.00
Suspended.....	24.00	Bureaucracy.....	20.00	Metrocross.....	12.00
Trinity.....	27.00	Hacker.....	20.00	Plutos.....	12.00
Witness.....	24.00	Hacker 2.....	20.00	Timeblast.....	8.00
Wishbringer.....	24.00	Little Comp. People.....	20.00	Championship Wrestling.....	20.00
Zork I.....	24.00	Shanghai.....	20.00	Alternate Reality.....	20.00
Zork II.....	24.00	Tass Times.....	20.00	Dungeon Reality.....	POA
Zork III.....	24.00	Strip Poker.....	15.00	Phantasie II.....	20.00
Silent Service.....	20.00	Tee-up.....	15.00	Leaderboard.....	20.00
Ultima II.....	20.00	Skyfox.....	20.00	Questprobe.....	15.00
Balance Of Power.....	30.00	Bridge Player 2000.....	15.00	Roadrunner.....	24.00
Defender/Crown.....	25.00	ST Karate.....	15.00	Roadwar 2000.....	20.00
Deja Vu.....	24.00	Protector/Station.....	20.00	Rogue.....	20.00
SDI.....	24.00	Pro Sprite.....	32.00	Super Huey.....	15.00
Uninvited.....	24.00	Pro Sound.....	45.00	Super Cycle.....	20.00
Arena/Brattacus.....	25.00	War Zone/Fireblaster.....	20.00	Super Tennis.....	20.00
Deep Space.....	24.00	Jewels Of Darkness.....	20.00	Winter Games.....	20.00
Silicon Dreams.....	15.00	Star Slider.....	20.00	World Games.....	20.00
Sterglider.....	20.00	Trailblazer.....	20.00	Xevious.....	20.00
Hollywood Poker.....	15.00	Typhoon.....	15.00		
Swooper.....	15.00	Passengers.....	17.00		
		Phoenix.....	17.00		

Please make cheques payable to: Systems Architects Ltd. We also accept Access and Visa. Prices subject to availability. See Amiga Listing for Prices of ST Infocom Adventures. Products not listed please phone for prices. All prices include VAT and delivery in the UK.

Callers are welcome at our shop

**SYSTEMS ARCHITECTS**

Systems Architects, Dept. PCW1, Syndicate Dept. Store, Market Place, Kingston Upon Thames, Surrey KT1 4BR. Tel: 01-549 3028 (24-hr ansaphone)

**THE CLASSIC  
MERCENARY**  
BY PAUL WOAKES

**NEW RELEASE:  
SPECTRUM 48K**

**NOVAGEN** £9.95

142 ALCESTER ROAD BIRMINGHAM B13 8HS 021-449 9516  
CONVERSION BY DR. DAVID AUBREY-JONES

*It's Down  
To You To Stop Them...*

**DEATH  
WISH 3**

**SPECTRUM  
48/128K • MSX  
Cassette £7.99**

**CBM 64/128  
AMSTRAD  
Cassette £9.99  
Disk £14.99**

*You Are Bronson*

**GREMLIN**

Gremlin Graphics Software Limited, Alpha House,  
10 Carver Street, Sheffield S1 4FS.  
Tel: 0742 753423



**W**e kick off this week with a letter from John Hannah from Shotts Community Education Centre. John has what he describes as an "under-utilised" Commodore 64 together with a Yamaha PSR50 keyboard, which has several auto-accompaniment features plus a Midi In and Out facility.

John wants a Midi interface and a sampler or synthesiser add-on for the 64 for use in four-track recording, and has been looking at the Dattel sampler and interface. He's very kindly enclosed handbooks for both the Dattel lines and the PSR 50, which makes it somewhat easier to comment in a sensible manner.

Dattel's Digital sound sampler is a monophonic unit which will give pretty high quality sampled sounds, which you can create yourself and store on to disc. You can replay them either through your monitor or through a hi-fi. Price is £49.99, and in addition, Dattel has alternative software

This would give you monophonic samples playable from the Yamaha keyboard plus multi-timbral synth sounds playable from the C64 sequencer (a SIEL, Jellinghaus, EMR, Steinberg or C-Lab package from music shops would do the trick).

## Played by hand

Obviously you couldn't use the C64-based sampler and sequencer at the same time, so the sampled parts would have to be played by hand after laying the initial tracks on to tape, unless you want to invest in a second C64. Everything should lock together timing-wise thanks to the Yamaha's ability to send and receive Midi clock information.

Obviously this is all a bit outside John's suggested budget of £120, but what did you expect – restraint?

On the ST front, Tigress Designs has, as

thicker overall sound, and you can detune them from each other in various ways and add effects such as delay and autopan.

*EDTX81Z* solves all the editing difficulties by putting the synth's parameters up on a single screen. In fact there are two alternative editing layouts – a fully graphic one with diagrams of the algorithms used, and an alphanumeric one dealing largely in figures for more precise editing.

It's possible to slave parameters together so you can alter several simultaneously, and to speed up or slow down the rate of change. Once you've edited a selection of sounds you can save them singly or in bulk, and if you save them to Bank 1 they will be instantly transferred to the synth as well.

You can also edit complete sets of performance parameters which assign the number of voices available for each sound, the sound used, the pan position, effects and so on.

You can play any note on the synth at any

# Four-track recording wanted – on a budget

Mark Jenkins comes to the rescue of a musically-inclined Commodore owner, and looks at a sound editor from new company Softworks..

which turns the unit into a drum sampler, called *Com Drum*.

So the Dattel system (with a Midi Interface at £29.99) is a good starting point, but since John already has a drum section on his keyboard, he can only usefully add monophonic samples using the Dattel setup.

In fact you won't find a polyphonic sampler under £350 or so (the second-hand price of the Midi-equipped Akai S612) so a synthesiser module may be more appropriate. The problem here is that the best one – the Commodore/Music Sales FM Synth Expander – *still* doesn't have a Midi interface more than a year after its release, so it can only be driven off the Commodore's Qwerty keyboard (the same applies to its sampler). You'd do better to wait for the new Cheetah synth module which will come in at around £180. This has six digital oscillators and is multi-timbral – each oscillator can play a different sound via Midi.

On the sampling side, you could go for the Midi-equipped *Microvox* at around £200 new. It provides much higher quality than the Dattel unit and although it's monophonic, it can produce different sounds from different zones on the controlling keyboard. Consult supersoft for dealer information.

Overall, my advice would be to go for the following set up: Dattel Midi Interface, Dattel Sampler, Cheetah Synthesiser, and C64 Sequencer software.

promised, delivered a colour version of *Iconix*, about the friendliest of the professional multitrack Midi sequencers. There's no hardware involved except an anti-pirating dongle, and the software allows you to control most of the sequencer functions from your synth using a system called soft keys. That way, you never have to touch the computer, which is handy if your controlling keyboard is on the other side of the room. Anyway, a full review of the new, upgraded, de-glitched colour version soon.

## Powerful synth

Also on the subject of the ST, we've been looking at *EDTX81Z* from a new company called Softworks.

This package runs on a monochrome monitor only and is designed to edit and store sounds for the Yamaha TX61Z synth module. As we should all know by now, the TX81Z is a tremendously powerful synth – at only £450 or so it fits into one unit of 19 inch rack space, plays eight-note multitimbrally, and is a pain to edit, thanks to its extreme lack of front panel controls.

That's a pity, because the machine has many powerful features which allow you to make the most of four-operator FM synthesis. The operators (sine wave oscillators) which create the sounds are also capable of non-sine waveshapes, which can give a

velocity using the computer's control button, which is handy if you want to do some editing without the control keyboard present, and you can re-program the Midi Patch Number response of the synth, so any sound you like can come up on receipt of any Midi patch change command.

You can also program a new scale for the synth and invert the existing microtonal scales. It's also possible on *EDTX81Z* to randomise the scale (perhaps useful for percussion sounds).

*EDTX81Z* lacks randomising functions for the sounds themselves, although these may be added on a later version. The company may also release editors for the Roland MT32 and the Yamaha DX7Mkl/TX802 eventually, and these are expected to sell at the same price – £59.95.

*EDTX81Z* is available from Softworks by mail or from Argent's in Denmark Street, London WC2. On the whole, the program is more precise than its main competitor, the Soundbits TX61Z Voice Master from Syn-dromic, but lacks its randomising functions and will only work on a monochrome monitor at the moment. It is £10 cheaper, though!

Softworks, 32 Chalcot Road, London NW1, 01-586 7331.

Tigress Designs, 25 Burmester Road, London SW17 0JL, 01-946 7870.

Supersoft 01-861 1166.



# MICRO-FILE

## DISCS

## JUMPDISK

MONTHLY MAGAZINE ON A DISK

For the **AMIGA**

### SEPTEMBER ISSUE NOW AVAILABLE

#### ARTICLES

NFL ORACLE: Documentation for program.  
TRANSFORMER FOR 1.2.  
AMIGA DISK: Sensitive Topic, a guide to buying disks.  
C NOTES: Program in "C", a new tutorial.  
PATTERN MAKER: Documentation for program.  
NEWSBREAKS: What's Happening.  
PD DISKS: £3 each, 110 Available.  
SHORTCUT! A Macro Bionic Diet.  
CLICKSAY: How You Can Use It.  
BIORHYTHM: Instructions for program.  
PRISM: Review of HAM Art Maker.  
READERS' FORUM: You Write This.  
JUMPSTART BASIC: How-to Series.  
TIPS: Readers Share.  
FAERY TALE: Review.  
ROBOT READERS: Review.  
THE EDITOR'S TWO CENTS SUBMISSIONS: We're a Paying Market.

#### PROGRAMS

NFL ORACLE '87: Last Year it Picked 63% of Pro Football Winners.  
PATTERN MAKER: Edit Amiga Basic Patterns.  
SHORTCUT! (Shareware): Macros for the CLI.  
BIORHYTHM: Have a Nice Chart!  
LIGHTYEAR EXCUSE: Science Fiction, Ch. 2.  
ZIPPY THE WONDER CAR: Light-year Arcade Game.  
CLICKSAY: Point-and-Click Speech.  
AESOP: Clicksay for Young Readers.  
20 MATCHES: Can You Beat the Computer?  
SKYWRITER: Template for Titles.  
ATPATCH (From PD Disk): Transformer 1.2 Patch.

**ALL OF THIS FOR  
£8.50 inc. VAT**

Please send cheque or money order made payable to:

**GEORGE THOMPSON SERVICES LTD,**  
OLD REIGATE ROAD, BETCHWORTH, SURREY RH3 7DR  
TELEPHONE: 073 784 4675

Price includes first class P & P, within U.K. & EUROPE

**SAME DAY DESPATCH OF ORDERS**  
**THERE IS A GUARANTEE WITH EVERY ISSUE**

(362)

## SOFTWARE

## SOVEREIGN MAIL-ORDER

289 St Saviours Road, Leicester LE5 4HG

Tel: (0533) 490043

OPEN Mon-Sat 11a.m. to 7.30p.m.

### DEALERS OF ATARI-AMSTRAD ST-COMMODORE SOFTWARE AND HARDWARE

#### DISCS

100 3 1/2" SS/DD FOR £109  
ALSO 25 5 1/4" DISCS FOR £10  
5 1/4" DISCS ARE 10 FOR £6.50  
3 1/2" DISCS SS/DD 10 FOR £14.00  
3 1/2" DISCS DD/DD 10 FOR £16.00  
MOUSE MATS AT ONLY £4.50

ST MOUSE EXTENSION LEAD -  
£4.99 EACH

COMMODORE POWER PACKS  
54 (CPFU) FOR £12.99

#### HARDWARE

**ATARI 40 STFM**  
Drive, Mouse and 1st Word  
and FREE software

**ONLY £459.00**

**ATARI 520 STFM**  
**£285.00**

+ FREE Mouse & Mat etc.  
FREE SOFTWARE

#### ST SOFTWARE

SUPERBASE	£79.95
G.F.A. BASIC	£49.95
BRIDGE PLAYER	£16.99
MOUSETRAP	£12.95
PHOENIX	£16.95
PEGAS ELITE	£59.95
NINJA MISSION	£8.95
TIMEBLAST	£8.95
F15 STRIKE EAGLE	£19.95

ALL PRICES INC. VAT & P/P.  
IN U.K. MAINLAND

**GET OUR SPECIAL PRICE LIST FREE**  
**SEND LARGE S.A.E. FOR PRICE LIST**  
**AND STATE WHICH COMPUTER**

(395)

### ★ EXCEPTIONAL VALUE ★

25 5.25" DS-DD DISKS

plus  
100 CAPACITY LOCKABLE DISK BOX

FOR ONLY £17.60 VAT & Delivery inclusive

All above inc. envelopes, label sets and hub rings

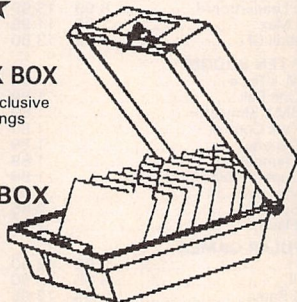
or  
50 5.25" DS-DD DISKS

plus  
100 CAPACITY LOCKABLE BOX

FOR ONLY £27.10

VAT & Delivery inclusive

No quibble guarantee



Cheques or PO's to:



**Manor Court Supplies Ltd**

Glen Celyn House, Penybont, Llandrindod Wells,  
Powys LD1 5SY. Telephone: 0597 87 784

● Educational and HMG orders accepted ● Trade enquiries



(325)

### STORT SOFT

#### ATARI MAIL ORDER SPECIALISTS

**LOOK AT THIS NOW! If you have anything to do with Atari ST! Mad crazy madness at the No. 1 super saver mail order company.**

For example Atari STFM £279.95, 1040 STF £475.00.

**Fantastic bonus when you order. Look what you get free!**

All hardware comes with free dust covers! All STs come with 5 public domain discs including CPM emulator and the arcade game Megaroids, 5 blank discs to get you going. Basic language disc and manuals.

#### 1 ORDER NOW WITHOUT DELAY

2 Look and see half page advert prices on all accessories, hardware, discs etc.

**Full range of Atari hardware & software - best prices - ring for details!**

Just write for more information. Cheques etc. payable to STORT SOFT (International orders add 10% and remit in pounds Sterling by bank draft or intl. money order. Write for quote in any other currency)

Access/Mastercard/Eurocard/Visa accepted. Credit Card Order Line - 0279 89509  
24 Hours a Day, 7 Days a Week - No Hidden Extras - What You See Is What You Pay

**18 Crown Close, Sheering, Bishop's Stortford,  
Herts CM22 7NX**

(434)

## ADVERTISING RATES FOR MICRO-FILE

Semi Display  
Lineage

£8 per single column centimetre (+VAT)  
35p per word (+VAT)

CALL SUSANNAH KING or ROBERT COLE on 01-437 4343 FOR SEMI DISPLAY ADVERTISING



# An Exciting Game for the Atari ST

So can you get your cargo, your sports car and yourself to New York in one piece? The chase is on.....Good Luck!

Marketing Chase © Cyclops Software UK 1987

# Manhattan Chaser

**CYCLOPS  
COMPETITION.**  
**FIRST THREE TO  
COMPLETE COURSE  
WILL WIN £50!**

[illegible]

incl. P&amp;P

Supplied on 2 disks

Please make cheque/P.O.  
payable to:

Cyclops Software U.K.,  
20, Gainsborough Gdns.  
Weston Lane,  
Bath,  
Avon,  
BA1 4AJ

Dealer enquiries  
welcome.

**CROWN CROWN CROWN CROWN CROWN**

AMSTRAD CPC		TAPE	DISC			TAPE	DISC			TAPE	DISC
Mini Office 2 .....		13.50	17.99	New Consultant .....		—	39.99	Falcon .....		8.95	—
Quill/Illustrator .....		21.95	—	Swift Spread Sheet .....		—	21.99	Oink .....		11.95	13.50
Card Box .....		—	52.99	Art Studio .....		13.50	15.50	Shadows Of Nurde .....		7.95	13.50
D-Base 3 .....		—	109.00	Tasword .....		12.99	17.99	Exec Leaderboard .....		8.99	13.99
Art Studio .....		—	17.99	Home Account .....		15.50	17.95	Mad Max .....		7.95	11.95
Popular Accounts .....		—	89.95					Football GFL .....		8.99	13.50
Combo Pack .....		—	139.95								
Super Calc 2 .....		—	44.95								
Illustrator .....		13.50	—								
Quill .....		15.50	17.99								
Tasprint .....		8.99	11.75								
Tasword .....		17.95	21.99								

Software available for  
Amiga, Amstrad, Electron,  
Spectrum, Commodore.  
Price includes P&P  
for orders over £7.  
Under £5 add 50p.

**Cheques and POs to:**

**CROWN SOFTWARE**  
47 Crown Drive, Spalding, Lincolnshire.  
Tel: 0775 69058



# STORT SOFT

## ATARI MAIL ORDER SPECIALISTS

### INCREDIBLE LOW PRICES!

ALL DISKS CARRY A NO QUIBBLE REPLACEMENT GUARANTEE ARE CERTIFIED 100% ERROR FREE AND COME WITH LABELS, 5 1/4" ALSO HAVE SLEEVES AND WRITE PROTECTS. FLIP SIDED DISCS HAVE TWO INDEX HOLES AND TWO NOTCHES.

#### BLANK 5 1/4" DISKS

DISK NOTCHER FREE WITH EACH 100 DISKS PURCHASED

UNBRANDED	TRIAL 10	25	50	100	10 in a plastic lib. case
SS48 TPI	£4.50	£9.00	£17.00	£33.00	£5.50
DS48 TPI	£5.50	£11.00	£19.00	£35.00	£6.50
DS96 TPI	£6.50	£13.00	£21.00	£37.00	£7.50
DS96 TPI FLIP SIDED	£7.00	£14.00	£22.00	£38.00	£8.00
MIMIC FLIP SIDED DS96 TPI	£8.95	£20.00	£38.00	£70.00	£9.95
MIMIC HIGH DENSITY 1.6meg	£23.00	£52.00	£100.00	£180.00	£24.00
COLOURED - mix & match or all one colour					
SS48 TPI	£6.50	£12.00	£22.00	£42.00	£7.50
DS48 TPI	£7.50	£14.00	£24.00	£44.00	£8.50
DS96 TPI	£8.00	£16.00	£28.00	£50.00	£9.00
SPECIAL PRICE!! Dysan DS48 TPI BOX OF 10 ONLY £10.95					

#### BLANK 3 1/2" DISKS

	10	25	50	100	10 in a plastic lib. case
MF1DD (SS/DD)	£12.95	£30.00	£58.00	£115.00	£13.95
MF2DD (DS/DD)	£14.95	£35.00	£63.00	£125.00	£14.95

#### BLANK 3" DISKS

	10	25	50	100
CF2	£25.00	£60.00	£110.00	£200.00
CF2DD	£33.00	£80.00	£150.00	£280.00

#### LOCKING DISK BOXES

5 1/4" HOLDS 50	£7.95	5 1/4" HOLDS 100	£9.95
3 1/2" HOLDS 40	£7.95	60/90 (HOLDS 60 3" or 90 3 1/2")	£9.95

#### COMPUTER ACCESSORIES

5 1/4" DISK NOTCHER (Double your disk capacity on a single sided drive)	£3.95
DISK CLEANING KITS Liquid non-abrasive type - protect your valuable software	
5 1/4" DCK	£3.95
3 1/2" DCK	£4.95
ST/IBM/AMSTRAD 1512 TO CENTRONICS PRINTER LEAD (2 metres)	£8.95
ST TO RS232 MODEM LEAD (2 metres)	£8.95
BATTERY POWERED MINI-VAC - for keyboards, printers etc.	£9.95
QUICKSHOT II+ (microswitch) joystick	£8.95

#### COMPUTER STATIONERY

PRINTER PAPER – Continuous fan fold, sprocket fed.				
SHEETS	11" x 9.5" 60gsm	A4 70gsm	11" x 9.5" 90gsm	A4 90gsm
500	£4.95	£6.95	£9.00	£9.95
1000	£8.95	£10.95	£14.00	£15.00
2000	£13.95	£16.50	£24.00	N/A
LABELS – Continuous fan fold, sprocket fed.				
	70mm x 36mm	89mm x 36mm	102mm x 36mm	89mm x 49mm
1000	£4.15	£4.25	£4.50	£5.75
2000	£7.50	£7.90	£8.40	£10.50
Please specify number of labels across (1, 2 or 3)				

#### SPECIAL OFFERS

520 STFM	£279.95
1040 STF	£475.00
1040 STF & SM125 MONO MONITOR	£570.00
MEGA ST (2 MEG)	£845.00
MEGA ST (2 MEG) & SM125 MONO MONITOR	£935.95
MEGA ST (4 MEG)	£1095.00
MEGA ST (4 MEG) & SM125 MONO MONITOR	£1190.00

All Hardware comes with free dust covers!! All STs come with 5 public domain disks including CPM emulator and the arcade game Megaroids, 5 blank discs to get you going. Basic language disk and manuals.

#### FULL RANGE OF ATARI HARDWARE & SOFTWARE - BEST PRICES - RING FOR DETAILS!

Just write for more information. Cheques etc. payable to STORT SOFT (International orders add 10% and remit in pounds Sterling by bank draft or intl. money order. Write for quote in any other currency)

ACCESS/MASTERCARD/EUROCARD/VISA accepted. CREDIT CARD ORDER LINE - 0279 89509  
24 HOURS A DAY, 7 DAYS A WEEK - NO HIDDEN EXTRAS - WHAT YOU SEE IS WHAT YOU PAY

18 CROWN CLOSE, SHEERING, BISHOP'S STORTFORD, HERTS CM22 7NX (252)

Atari ST  
User Group

Star U.K.

Atari ST  
User Group

Star U.K. Elmdale House, 8 Elm Place, Aberdeen. AB23SU

Telephone (0224) 635549 after 6pm Prestel 819992249

### ALL Public Domain - £1

Modem packages including software, modem leads, manuals etc from only **£89.00**

Pro Copy ST 1.41 only **£34.95**

Yes, our copy charge for public domain software is only £1. Why pay £5-£10?

We have a wide selection of quality software for you. Demo's, Utilities, Games, Pictures, Business, Art, Music etc.

We have many other services available. Send a large S.A.E. for details of all our services, and free public domain catalogue.

**Newsletter** Newsletter service only **£5.**

We have the best quality newsletters in the U.K.!!! They are printed using the best laser printer that is currently available. We have reviews, articles, many special offers, pen pals and much more! Typical offers: Pro Copy 1.40 - 50% off! Modem, software, cable etc only £75.

Send cheque/postal order made payable to Star U.K. to subscribe to our newsletter service for 1 year (6 newsletters).

Registered as a User Group with Atari Corp

(432)

### PANTHER SOFTWARE LATEST RELEASES !!!

Coming soon . . . Easy Spell!

#### Company '87

The Business Simulation  
Game for the inquisitive mind - **£14.99**

#### Daily News

Do you have the perseverance to run a daily newspaper? - **£9.99**

Games, Educational and Business Software for the Amstrad PC and IBM-compatibles

#### STOP PRESS !!

Panther Software for all machines coming soon!

2 River Way Gardens, The Meadows, Nottingham NG2 3LL

Telephone: 0602 860664

Trade enquiries welcome

(413)

### LOOK! NEED HELP? . . . well, read on

If you are an owner of Amstrad CPC or PCW, and don't ever get a chance to help other users, write reviews or air your opinions - **NOW YOU CAN.**

Amstrad CPC Newsletters and PCW File provide these opportunities and include hints and tips to keep you going!

But the best part is, it's **NON-PROFIT MAKING** CPC Newsletters are £5 for 6 and PCW files are £7 for 6 **FANTASTIC** issues. And, of course, you get access to the Public Domain Library **ABSOLUTELY FREE** when you subscribe to all issues.

What more could you ask for? Give it a go and you'll be back for more and more. Send for a sample, just enclose a SAE - you'll be very surprised.

60p for CPC Newsletter. PCW File **£1.25**

Amstrad Computing Newsletters CPC Newsletter + PCW File

**Mr. C. A. BRYANT,**

11 Havenview Road, Seaton, Devon EX12 2PS

"Give me a call on 0297-20456 after 7 or anytime Sunday"

**LOOK! LOOK! LOOK! CPC - PCW FILE**



# CRIBBAGE

The popular pub game six card cribbage is now available for the Spectrum 48K/128K

Features include:

**IMPRESSIVE FULL COLOUR  
PLAYING CARD GRAPHICS  
100% MACHINE CODE  
TWO LEVELS OF PLAY  
AUTOMATIC SCORING  
HELP OPTION FOR BEGINNERS**

*Six card cribbage is suitable for both beginners and experienced crib players and comes with full instructions and rules of the game.*

★ ★ ★ ★ MONEY BACK GUARANTEE ★ ★ ★ ★

If you are not delighted with six card cribbage then simply return the tape within 5 days and your cash will be refunded.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Send cheque or postal order for £6.50 to

## ESEM SOFTWARE

112 Wrington Close, Little Stoke, Bristol BS12 6EJ  
Tel: 0454 612811

(260)

## Athene Consultants

33 Holly Grove,  
Fareham, Hants PO16 7UP  
Tel: 0329 282083

### ALL DISCS SUPPLIED WITH LABELS AND LIFETIME GUARANTEE

Description	Price
3-5 DS/DD 10 discs.....	£11.50 inc.
3-5 SS/DD 10 discs.....	£10.95 inc.
Storage Box (holds 10 discs) ....	£1.50 inc.

Quantity Discount starts at 50 discs  
3-5 DS/DD 50 discs..... **ONLY £52.90 inc.**  
(92p each + VAT)  
3-5 SS/DD 50 discs..... **ONLY £49.90 inc.**  
(87p each + VAT)

Despatch by 1st class post

Remember prices include VAT, postage and labels.

Same Day Express Despatch add £1 per 10 discs (by 1st class post).

All discs by top manufacturers with a Lifetime Guarantee.

PLUS a 14 Day Money Back Guarantee.

To take advantage of these very low prices, send cheque/P.O. to:

## Athene Consultants

Dept (POP), 33 Holly Grove,  
Fareham, Hants PO16 7UP  
Tel: 0329 282083  
Prestel MBX 329282083

**CALL FOR THE LOWEST  
PRICES FOR QUANTITY IN U.K.** (414)

## Software Specials

SPECTRUM 48K		AMSTRAD	
Return To Oz.....	£1.99	Raid.....	£1.99
Mantronic.....	£1.99	Shadins Road.....	£2.99
Infiltrator.....	£1.99	Sabre Wolf.....	£1.99
Fatworm.....	£2.99	Bobby Bearing.....	£3.95
		Unbelievable Ultimate.....	£2.99
SPECTRUM 128K		Return To Oz.....	£1.99
Barry McGuigans Boxing.....	£2.99	Thai Boxing.....	£1.99
Ballblazer.....	£2.99	Classic Collection.....	£2.99
Thanatos.....	£2.99	Space Shuttle.....	£2.99
COMMODORE 64		COMMODORE 64 DISC	
Robin Of The Wood.....	£1.99	Little Comp People.....	£3.95
Transformers.....	£1.99	Koronis R.A.....	£3.95
Thai Boxing.....	£1.99	Hacker.....	£3.95
Back/Future.....	£1.99	Ballblazer.....	£2.95
Barry McGuigan.....	£1.99	Murder On The Mississippi.....	£3.95
Escape/Paradise.....	£1.99	Super Huey.....	£2.95
Majic Madness.....	£1.99	Super Zaxxon.....	£1.95
Road Race.....	£1.99	COMMODORE 16	
Masters/Universe.....	£1.99	Way Of Tiger.....	£2.99
Dragonskull.....	£1.99	Bridgehead.....	£2.99
Outlaws.....	£1.99	Space 2.....	£1.99
Beach Head 2.....	£1.99	Panic Penguin.....	£1.99
Inheritance.....	£1.99		

## ATARI 520 STFM £269.95

Available Now!!

## PANASONIC KXP1081 PRINTER

120 cps Dot Matrix Printer - NLQ Option, Condensed Option, Friction or Tractor, Super Printer

**ONLY £159.95 + VAT**

## PHILIPS CM 8533

Medium Resolution Colour Monitor  
**ONLY £274.95**

inc. free lead for Atari ST, Commodore or Amiga

## ATARI ST SOFTWARE

Tracker.....	£18.95	First Word Plus.....	£57.00
Knightlore.....	£15.95	Starglider.....	£18.95
Guild Of Thieves.....	£18.95	Into Eagles Nest.....	£15.95
Colonial Conquest.....	£22.95	Autoduel.....	£19.95
Roadrunner.....	£18.95	Kings Quest III.....	£19.95
Barbarians.....	£18.95	Outcast.....	£7.95
T.N.T.....	Call	Death Strike.....	£11.95

## BOOKS

All books £1 each  
Plus 50p P.&P. on each book

### SINCLAIR - SPECTRUM

Creating Arcade Games  
Creating Adventure Programs  
Spectrum Handbook  
Basic Made Easy  
Discover Your ZX Spectrum  
60 Games And Applications  
Putting Your Spectrum To Work  
Programming Your ZX Spectrum

### AMSTRAD

Learning Programs

### COMMODORE 64

Graphic Art For The C64  
Putting Your C64 To Work

### ACORN ELECTRON

Adventure Games For The Electron  
Instant Arcade Games - Electron  
Dynamic Games For The Electron

### GENERAL

Hackers Handbook  
Illustrating Computers Without Jargon  
Business Guide To Computers

**KNIGHT  
GAMES**  
£1.99  
C64

**KRAKOUT**  
£2.99  
SPECTRUM, C64  
AMSTRAD

**MARTIANOIDS**  
£2.99  
SPECTRUM

**EIDOLON**  
£2.99  
C64,  
SPECTRUM

**LITTLE  
COMPUTER  
PEOPLE**  
£2.99  
SPECTRUM 128  
COMMODORE 64

**XEIVIOUS**  
£1.99  
SPECTRUM, C64  
AMSTRAD

**MONTY ON  
THE RUN**  
£1.99  
SPECTRUM

**BUTCH  
HARD GUY**  
£2.99  
SPECTRUM

**KORONIS  
RIFT**  
£2.99  
COMMODORE 64  
SPECTRUM

**HACKER**  
£2.99  
SPECTRUM 48K  
SPECTRUM 128K

**STAR GAMES 1**  
comprising:  
Way of the Tiger  
Rescue on Fractalus  
Barry McGuigan Boxing  
Beach-head 2  
**£3.99**  
C64, Spectrum, Amstrad

**UNBELIEVABLE  
ULTIMATE**  
comprising:  
Attic Attack  
Sabre Wolf  
Underworld  
Alien 8  
**£2.99**  
Spectrum only

**UNBELIEVABLE  
ULTIMATE VOL. 2**  
comprising:  
Lunar Jetman  
Jatpac  
Tranz-AM  
Pstt  
**£2.99**  
Spectrum only

**CLASSIC  
COLLECTION**  
Auto Mania  
Witches Cauldron  
Pyjama Rama  
Battle of the Planets  
**£2.99**  
Commodore 64

**SPECTRUM  
STINGERS**  
comprising:  
Bruce Lee  
Pole Position  
Cyber Run  
Zoro  
**£2.99**  
Spectrum only

**AMSTRAD  
ACADEMY**  
Zoro  
Bruce Lee  
Bounty Bob  
Dambusters  
**£2.99**  
Amstrad only

**UNBELIEVABLE  
ULTIMATE**  
comprising:  
Entombed  
Staff of Karmah  
Bike Witch  
Imhotep  
**£2.99**  
Commodore 64

**SCOTT  
ADAMS SCOOPS**  
Pirate Adventure  
Strange Odyssey  
Voodoo Castle  
Buckaro Banz  
**£2.99**  
C64, Spectrum, Amstrad

**CHEETAH  
125+  
JOYSTICK**  
£6.95

**COMMODORE  
C2N  
CASSETTE  
RECORDER**  
£29.95

**PROGRAMMERS  
REFERENCE  
GUIDE  
C64**  
£4.95

LATEST SOFTWARE RELEASES			
	CO	SP	AM
Summer Gold.....	£6.95	£8.95	£8.95
Pirates.....	£10.50	—	—
Exolon.....	£6.25	£5.50	£6.25
Wizball.....	£6.25	£5.50	£6.25
Death Wish 3.....	£6.95	£5.50	£6.25
	CO	SP	AM
Trio Hit Pak.....	£6.95	£8.95	£6.95
Last Ninja.....	£6.95	—	—
Epy Epics.....	£6.95	—	—
World Class Leaderboard.....	£6.95	—	—

**INTERNATIONAL  
SOCCER  
CARTRIDGE**  
C64  
£3.95

**SIMONS  
BASIC  
CARTRIDGE**  
C64  
£9.95

**KONIX  
SPEEDKING  
JOYSTICK**  
£10.95

## MAIL-CENTA

17 Campbell Street, Belper, Derbyshire DE5 1AP. Telephone: 077382 6830

Please make cheques/P.O.s to Mail-Centa: Telephone orders using Access/Visa welcomed  
Postage: UK under £5 please add 50p; over £5 free (not books); Europe 75p; strictly mail orders only

(431)



## FOR SALE

### ATARI 520 STFM NOW IN STOCK FOR NEW PRICE ONLY £279.95

Includes mouse controller, manual, language disc and other utilities

**PACK 1** - Atari 520 STM complete with mouse,  
1meg disc drive complete with manuals and demos  
£369

**PACK 2** - Atari 520 STM with 1 meg drive mono  
monitor manuals and demos at £459

#### ST SOFTWARE AT GIVEAWAY PRICES

Balance of Power .....	£25.99	Brian Clough's Football	
Championship Football .....	£18.95	Fortunes .....	£18.95
Karate Kid II .....	£18.95	Air Ball .....	£18.95
The Pawn .....	£18.95	Hard Ball .....	£18.95
Prosound Designer .....	£46.95	Crystal Castles .....	£10.99
Colonial Conquest .....	£23.95	Gauntlet .....	£18.95
Hades Nebula .....	£15.95	TNT .....	£15.95
Guild of Thieves .....	£18.95	Roadrunner .....	£18.95
Arkanoid .....	£11.95	Jupiter Probe .....	£11.95
Prohibition .....	£14.95	Death Strike .....	£11.95
Barbarian .....	£18.95	Tracker .....	£19.95
Golden Path .....	£18.95	Kings Quest 3 .....	£18.95

#### 3.5" DISCS

3.5" 10 for £12.95

3.5" 20 for £24.95

3.5" 50 for £55.95

All prices include p&p.

Lockable disc boxes 3.5" holds 90 .....£11.95

**Spend over £50 on Software and get a Free Calculator**

### AMIGA A500 NOW IN STOCK £529

#### AMIGA SOFTWARE AT GIVEAWAY PRICES

Balance of Power .....	£29.95
Defender of the Crown .....	£26.95
World Games .....	£19.95
Guild of Thieves .....	£19.95
Winter Games .....	£19.95
Star Glider .....	£19.95
Championship Football .....	£19.95
Swooper .....	£16.95
Deluxe Paint II .....	£129.00
Barbarian .....	£19.95
Instant Music .....	£24.95
The Surgeon .....	£39.95
Karate Kid II .....	£19.95
Kings Quest 3 .....	£24.95
Portal .....	£39.95
Faerytale .....	£39.95
Kampfgruppe .....	£24.95
Amiga Karate .....	£16.95
Phalanx .....	£8.95
Space Battle .....	£8.95
Roadwar 2000 .....	£19.95
Challenger .....	£8.95
Superhuey .....	£16.95
Uninvited .....	£24.95

More new releases this week phone for details

**Buy two games or more and deduct 50p off each game**

Amiga 512 Rom upgrade .....	£99.99
Triangle 1 meg drive (Amiga) .....	£39.95
Cumana 1 meg drive (Amiga) .....	£149.95
Flight Simulator 2 .....	£39.95

This is just a small selection of our Amiga Software. Send S.A.E. for list

Other Commodore and Amiga peripherals in stock, please phone for details

**Amiga A2000-£1095** We are Commodore appointed dealers (360)

## SOUND N VISION

11 Silk St, Leigh, Lancs WN7 1AW.

**Phone now for details - Tel: (0942) 673689**

Cheques and P/Orders payable to: Sound N Vision P&P/VAT INCLUDED

Visitors welcome in showroom. Send S.A.E. for price list.

## MFB COMPUTERS

### I SUMMER MADNESS SPECIAL OFFERS I

SPECTRUM 128 + 2, rec. retail £149.95, our price **£145.00**

SPECTRUM 128 + 2 with gift pack six games + joystick, rec. price £159.95,  
our price **£155.00**

AMSTRAD CPC 464 with green screen monitor + games pack, rec. retail  
£199.95, our price **£189.95**

AMSTRAD 464 with colour monitor + games pack, rec. retail £299.95,  
our price **£289.95**

AMSTRAD CPC 6128 with green monitor, rec. retail £289.95,  
our price **£289.95**

DISCS - AMSTRAD C/F2 £28.50 box of 10 or **£2.99** each  
FAST COMPUTER REPAIR SERVICE FOR ALL LEADING MAKES OF  
PERSONAL COMPUTERS

Example: SPECTRUM £17.05 COMMODORE 64 from **£25.00**

Send self-addressed envelope for software list stating which model

14 VICTORIA ROAD, ELLAND, WEST YORKS

Tel: 0422 76698

(430)

## COMPUTER BARGAINS

Commodore SX 64 .....	£349.99
Commodore 64 .....	£99.99
Commodore + .....	£39.99
Commodore 128 .....	£149.99
Commodore 1541 .....	£139.99
Commodore 1701 .....	£149.99
Commodore 801 Printer .....	£79.99
Commodore 1101 D. Printer .....	£129.99
Commodore 1701 Monitor .....	£139.99
Amstrad 6218 Colour .....	£279.99
Amstrad 664 .....	£199.00
Amstrad 464 .....	£164.99
Sinclair +2 .....	£99.99
Ianstone Computers .....	£69.99
Commodore Data Cassettes .....	£24.99

**Tons of computer equipment to clear**

**From: 2 BIT COMPUTERS**

26-28 Bowesfield Lane, Stockton, Cleveland TS18 3ER

Tel: 0642 604768

(404)

## ★ SPECIAL OFFERS ★

### Incredible Price Cuts

5 1/4" DS/DD unbranded	3 1/2" DS/DD unbranded
10.....£6.35.....£6.15	10.....£13.55.....£11.50
25.....£14.99.....£12.50	25.....£32.00.....£28.95
50.....£26.99.....£19.95	50.....£63.00.....£55.75
100.....£49.99.....£34.95	100.....£119.00.....£109.05
150.....£96.99.....£52.95	150.....£179.00.....£164.75
250.....£119.99.....£85.95	250.....£279.00.....£271.75
500.....£219.99.....£165.95	500.....£519.00.....£511.75

3" Maxell CF2 (10) .....£25.00.....£22.50

## M.D.S. Computer Supplies

11 Church Street, Banbridge BT32 4AA

Credit Card Hotline (08206) 23477

Twenty-four hours

A Division of Brocklis Enterprises Ltd.

(433)

## AMIGA PUBLIC DOMAIN SOFTWARE

We have the very latest Fish # numbers #1 to #88  
and Amicus numbers #1 to #22 disks in stock. For  
full details of programme content PLUS Tutorial  
"PD Without Tears" PLUS the JUMPDISK Magazine  
PLUS a collection of programmes and articles from  
previous issues of JUMPDISK. Please send a \$3.50  
cheque/PO for the "JUMPDISK SAMPLER". We  
will send a copy by return.

**George Thompson Services Ltd.**  
Old Reigate Road, Betchworth, Surrey RH3 7DR  
Tel: 073-784 4675 (291)

**TATUNG** Einstein with colour monitor  
and software. Excellent condition,  
£150. Tel: Southport 37411. Even-  
ings and weekends.

**AMERICAN EXPRESS** 3.5 inch  
discs - s.s. 85p each, d.s. 96p each.  
Sony branded discs d.s. £1.30 inc.  
VAT. Collection only. Tel: 01-672  
1672. 2 London Road SW17. No  
minimum order.

**DEE JAY SAVERS**  
All computer software at BARGAIN prices.  
Business Software also available.  
Send S.A.E. stating computer.

**DEE JAY SAVERS**  
62 Eagles Close  
SITTINGBOURNE  
Kent  
ME10 3RA (374)

## RIBBONS

## ALADDINK

**FABRIC RIBBON CASSETTE RE-INKING**

**Trial offer: £1 per ribbon**

Post used cassettes with payment to:

**ALADDINK (Dept PC),**

4 Hurkur Crescent, Eyemouth,

Berwickshire TD14 5AP

Tel: 08907 50965 (338)



## FOR SALE

### Atari 800 XL / 130 XE Essential Utilities

#### Transdisk Version 3.0

The most powerful tape to disc system for the Atari now made even better. Transfers commercial, machine code, "boot" cassette games or any other software to disc. Single, multi-stage and now even non-standard format tapes present no problem to Transdisk. Plus, enjoy the convenience of loading and running your newly transferred software from an autorun disc menu. No other tape to disc utility for the Atari is as powerful or successful as this! £19.95 inc. Supplied on disc with instructions.

#### The Freezer!

An amazing new utility for the Atari! "Freezer" programs while they are RUNNING on your computer. The Freezer then takes over control and allows you to make a back-up copy of the frozen program. The back-up copy will load, and restart from the frozen point, on ANY Atari XL/XE computer, independent of The Freezer! Freezes disc OR tape programs even those that are heavily protected! Easy to use - hit one key to freeze the program in memory then insert a blank disc and hit another key to save it - that's it! £19.95 inc.

Send an S.A.E. or phone for more details of these utilities.

Special offer order both programmes for £35.00

Make Cheque or P.O. payable to DIGICOMM and send your order to:

**DIGICOMM**

170 Bradwell Common Boulevard, Milton Keynes, Bucks MK13 8BG. Tel: 0908 663708. (121)

### BLANK CASSETTES

#### WITH LIBRARY CASES

	C10	C15	C20	C30
20	7.50	7.70	7.90	8.70
50	16.00	16.20	16.90	18.50
100	29.00	30.00	31.00	35.00

Fully Inclusive (C.O.D. £1 extra)

#### DISKS

10 5 1/4" DS/DD  
£6.50 inc. case  
10 3 1/2" SS/DD  
£16 inc. case  
10 3" AMSOFT  
£26 inc. case

### MEMOTECH COMPUTERS AND ACCESSORIES

MTX 512 COMPUTER	£43.00
DMX 80 PRINTER	£150.00
RS232	£30.00
PASCAL ROM	£30.00
SPECULATOR ROM	£30.00
1/2 mb. DISK DRIVE & INTERFACE	£160
1 mb. DISK DRIVE & INTERFACE	£160

All the above prices are fully inclusive. We stock the entire Memotech Range. Order/Enquiries to:

**UK HOME COMPUTERS**  
82 CHURCHWARD AVE, SWINDON,  
WILTS SN2 1NH  
24-hr Phone Service 0793 695034

### PANTHER SOFTWARE LATEST RELEASES!!!

Coming soon... Easy Spell!

Company '87. The Business Simulation Game for the inquisitive mind - £14.99. Daily News. Do you have the perseverance to run a daily newspaper? - £9.99. Games, Educational and Business Software for the Amstrad PC and IBM-compatibles

STOP PRESS!! Panther Software for all machines coming soon!  
2 River Way Gardens, The Meadows, Nottingham NG2 3LR  
Telephone: 0602 850664 Trade enquiries welcome (413)

### NEMSARION

#### A FANTASY/SCI-FI SPOOF PBM

You play the SHMUCK... errr... leader of five brave mortals. Plucked out of time, you are thrust onto the deadly world of NEMSARION. Can you show a tree that it is, in fact, a set of traffic lights? Do you really want to? Find out! Send £4.99 for start-up + 3 free turns! Or send for info' leaflet.

Please make all cheques payable to L. NAPOLITANO.

Send to:

**NEMSARION**

Maim Games, 48 Ledgers Road,  
Slough, Berkshire SL1 2RL (425)

### MONEY FROM YOUR AMSTRAD PCW

Got a PCW? Or just thinking of buying one? Either way you can't go wrong, the PCW is the perfect small business computer. Did you realise, though, just how many ways there are of making money with one? I don't mean running your own business, but carrying out simple tasks for other people. Tasks which are very well paid.

Experienced user or beginner, we can show you how to make real money, full or part time, providing straightforward computer services. No programming, no hard selling, no hassling, and you operate at home. Companies spend more every year on computer services. Don't miss your opportunity in this exciting and growing field!

Write or phone for free details of this complete business plan specifically for the Amstrad PCW owner.

#### POINT ONE PUBLISHING

Box 34, St. Bees, Cumbria CA27 0BN  
Tel: 0946 822 242 (409)

### FLOPPYSHOP ST PUBLIC DOMAIN SOFTWARE LIBRARY

We're an independent user group dealing exclusively with the ST. Annual membership £5.00 including newsletter. We charge £3-£3.50 per disc including P&P.

Send SAE to the address below for details:

#### FLOPPYSHOP ST,

50 Stuart Crescent, Northfields, Aberdeen

(406)

### DUPLICATION

#### jbs records

#### COMPUTER PROGRAMS

REAL-TIME or HIGHER-SPEED professional Cassette Duplication and Blanks 1 to 1,000+. Computer printed cassette labels, BBC & PC Disk copying 1 to 500+.

Fast Security Delivery Service.

FILTERBOND LTD. - JBS RECORDS DIV.,  
FREEPOST, 19 Sadlers Way, Hertford SG14 2BR.  
0992 500101 17

## SERVICES

### FAULTY SPECTRUM?

As you are probably aware from press reports Sinclair Computers no longer have a repair department.

Our computer repair workshop has been an OFFICIAL Sinclair Repair Depot for the past six years and we are pleased to announce that we will continue to do your out of guarantee repairs as in the past.

Send your faulty computer DIRECT

SPECTRUM .....	£18.75 inc parts
ZX81 .....	£11.50 inc parts
16K RAM .....	£9.95 inc parts
MICRODRIVE .....	£15.95 inc parts
INTERFACE 1-11 .....	£18.75 inc parts

CALL OR SEND WITH CHEQUE OR P.O.

**T.V. SERVICES OF CAMBRIDGE LTD**  
FRENCH'S ROAD, CAMBRIDGE CB4 3NP  
Tel: 0223 311371

28TV

### EAST LONDON MICRO SERVICE CENTRE

Spectrum, Commodore, Amstrad, Atari, MSX plus peripherals.

Turnaround typical of 2-5 days.

Three months warranty guaranteed.

Postal repairs undertaken.

Computer IC's components sold.

Budget games, software and accessories sold. Mail order welcome. Trade enquiries welcome.

Open 9am-8pm Mon.-Sat

#### SAN ELECTRONICS

63 Plashet Grove, East Ham  
London E6 1AD  
Tel: 01-472 4871

Four minutes walk from Upton Park Tube Station, (358)

**AMSTRAD 6218** plus colour monitor, computer fitted, multiface 2, tape to disc copier, under guarantee, £200 of software, plus data recorder, £295 o.n.o.

400/800 NOW

**LOOK** ST

#### ATARI OWNERS

Are you having difficulty finding suitable software. If so, then look no further. We have available for both hire and purchase one of the largest selections of both UK and American titles to choose from. Games and Utilities for all ages. Hardware and add-on utilities at discount prices and special deals regularly being offered. If you would like further information please send a large s.a.e. to:-

CHARWOOD PRODUCTS AND GAMES  
30A Warwick Avenue, Ossett, Loughborough  
Leicestershire LE12 8HD  
Tel: 0509 43 804

**C128, C2N, 1570**, monitor, sound expander and keyboard. Action Replay Three, Neos mouse, Currah speech. Music Maker, disc notcher, games, books, manuals, £450 o.n.o. Tel: 0778 345120.

**MEMOTECH** tape to disc conversion booklet for all disc systems including cp/m. Completely rewritten, extending to 35-pages, packed with information and references. Convert favourites like Quazzia, Qogo, Sepulcri for £5.00. Tel: 0946 66770.

### COMPUTER REPAIRS Fixed Super Low Prices!

Inclusive of parts, labour and VAT



### FIRST AID FOR TECHNOLOGY

1 week turnaround

Free collection/delivery available for local area

#### ★ INTRODUCTORY OFFERS ★

SPECTRUMS	£14 inc. + Free Game
C64	£22 inc. + Free Game
C16	£18 inc.
VIC20, C+4	£22 inc.
BBC	£32 inc.
ELECTRON	£19 inc.
AMSTRAD 464	£32 inc. + Free Game
C & N CASSETTE UNITS	£19 inc.
C64 P.S.U. FOR SALE	£20 inc.

Please enclose payment with item - 3 month warranty on repair

Please enclose advert with repair

**W.T.S. ELECTRONICS**

(182)

5-9 Portland Road, Luton, Beds LU4 8AT. Tel: 0582 458375. Telex: 265871

### COMPUTER REPAIRS

Fast and Professional Repair Service  
in the South East!

Repairs to most makes of micros and peripherals

Amstrad approved service centre

Three month warranty on all work

#### MICRO COMPUTER REPAIR SERVICES

47 Mungo Park Way, Orpington, Kent  
Tel: Orpington (0689) 73353 any time (428)

### FAST COMPUTER REPAIR CENTRE - IN LONDON

\*BBC Micro, Commodore, Spectrum

\*Amstrad, Others

\*We sell spare parts

\*Used Micros bought and sold

\*Eprom Programming Service

Phone: 01-863 7166

#### PROMPT ELECTRONICS

Unit 4, 15 Springfield Road,

Harrow, Middx HA1 1QF

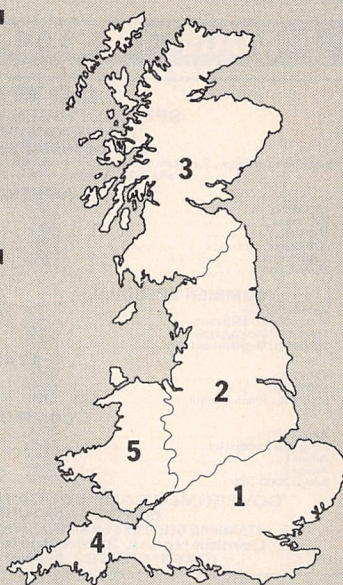
(entrance in Amersham Road) (70)

**AMSTRAD CPC 6128**, with colour monitor, 10 games, cassette lead and several Amstrad magazines and books. Sell for £295 o.n.o. Tel: Thanet (0843) 34945. Ask for Ralph.

**ATARI ST**, 1 Mb computer system including Epson FX80 printer, £495. Publishing Partner and other ST, BBC, QL, IBM PC software, all half price. Casio CZ101 synthesiser plus software, half price. Tel: 021-742 1969.



M

CRO  
SLE

## 1 THE SOUTH EAST

## LONDON

## DIGITAL SHADES LTD

Amiga 500  
Special offers

★ A500 plus starter kit &amp; modulator

★ £499 ★

Atari ST  
Special offers

★ Atari 520 STFM plus starter kit

★ £260 ★

*If you can't see the machine, peripheral, or software you want, then ring now for new low prices or send S.A.E. for mailing list.*

(378)

Mail order hotline 01-471 7969

All prices include VAT

9 Selsdon Road, Upton Park, London E13 9BY

## TIMESOFT

35 LONDON ROAD, TOOTING SW17 9JR. TEL: 01-685 9849

**WE ARE THE BEST - LOOK AT THIS -  
WE STOCK THE SEGA SYSTEM  
Ring us now for details!!!**

## ATARI ST

TNT .....	£16.95
Boulderdash .....	£16.95
Kings Quest III .....	£19.95
Degas Elite .....	£23.95
Metrocross .....	£15.95
Sentinel .....	£15.95
Space Quest .....	£19.95
Knight Hawk .....	£15.95
221B Baker Street .....	£17.95
Film Director .....	£40.00
Art Director .....	£36.00
OCP Art Studio .....	£19.95
Leaderboard Tour .....	£12.95
Typhoon .....	£5.50
Stationfall .....	£17.00
Slap Fight .....	Phone
Tai-Pan .....	Phone

## AMIGA

Kings Quest III .....	£20.95
Space Quest .....	£20.95
Leaderboard .....	£20.95
Deluxe Paint II .....	£64.95
Deluxe Print .....	£20.95
Skyfox .....	£13.50
Bards Tale .....	£20.95
Chessmaster 2000 .....	£20.95
SDI .....	£26.95
Super Huey .....	£17.95
Mean 18 .....	£24.95
GFL Football .....	£19.95
Winter Games .....	£19.95
Challenger .....	£8.95
Phalanx .....	£8.95
Cruncher Factory .....	£8.95
Defender of the Crown .....	£26.95

Ring us!! We have the most frenzied mad prices for all software so much we can't list it. So pick up the phone and ring us right Now!!! We have what you want at the price you want to pay.

Phone or write for a FREE catalogue

01-685 9849

Make cheques/P. Orders payable to: TIMESOFT

ACCESS phone orders welcomed

(422)

## DEALERS!

You can reach 40,000 readers for as little as £25 a week!  
For more details phone Susannah on (01) 437 4343



## 1 SOUTH EAST

### SOUTHEND-ON-SEA

# ESTUARY

## PERSONAL COMPUTERS

Commodore's Amiga A500 available NOW. Call for price.  
Buy the Atari STFM at the new price – only £299 inc. VAT.  
Software at discount prices.

**Victoria Circus Shopping Centre**  
(escalator from railway station)  
**Southend on Sea**

**Tel: (0702) 614131**

(289)

## SOUTHEND

### A.S. and T. Ltd.

*Largest Atari ST dealer in Essex*

**Tel: 0702 510151**  
Unit 32/33  
Rutherford Close  
Eastwood Industrial Estate  
Leigh-on-Sea  
Essex

(Progress Road/A127)

(388)

## STIRLING

### TECH SUPPLIES

Ex-stock electronic  
components, computers,  
peripherals, word processors,  
test equipment and office  
equipment.

*NO ORDER TOO SMALL  
NO ORDER TOO LARGE*

**19i Winchester Avenue, Denny,  
Stirlingshire FK6 6QE**  
**Tel: 0324 825627**

Open hours: 9am–4pm, 7.30pm–10.30pm

(426)

## 3 SCOTLAND

### GLASGOW

*THE BEST IN SCOTLAND FOR DISCOUNT*

## CITY CENTRE COMPUTERS

136 Ingram Street, Glasgow G1. Tel: 041-552 4222

### SUMMER BARGAINS AT LOW PRICES

AMIGA A500 .....	£420
ATARI 520 STF .....	£280
ATARI 1040 STF .....	£490
Used COMMODORE 64s .....	£126

*Also available, Atari and Amiga add-ons*

### SPECIAL OFFER: 15% OFF ALL SOFTWARE

PUBLISHING PARTNER .....	£130
C64 AND VIC POWER SUPPLIES ONLY .....	£10.50

### REAL BARGAIN:

3 1/2" DS/DD DISCS .....	£20 for 20 or £45 for 50
5 1/4" DS/DD DISCS .....	£19 for 50

Huge discount for bulk orders  
Above prices do not include postage for mail order

(436)

## GLASGOW

### GLASGOW COMPUTER CENTRE

*Atari appointed dealer  
and Service Centre*

*Specialists in Atari ST Computers*

**VIRGINIA GALLERIES**  
(1st FLOOR)

**33 VIRGINIA STREET  
GLASGOW G1 1TU**

**TEL: 041-552 1522**

(136)

## EDINBURGH

### The CENTRE SCOTLAND Commodore Business Centre Amiga Specialists since 1985

Amiga A500 and A2000 now available.  
Technical and software support to our  
customers. Full range of AMIGA software and  
peripherals.

*Send S.A.E. for our software catalogue*

**4 Hart Street Lane  
Edinburgh EH1 3RN**  
**Tel: 031-557 4242 (24 hrs.)**

(379)

## 2 THE MIDLANDS AND NORTHERN ENGLAND

### MANCHESTER/HINCKLEY

### COMLEX SPECIAL PRICES WITH THIS AD!

#### AMSTRAD SUMMER DEALS

##### Amstrad 1640 20Mb Tandon £999

Including twin floppy, Supercalc, Wordstar printer – £649; Colour version add £159; with Tandon 20 Meg hard card add £199. All prices + VAT – phone for others not listed.

#### AMSTRAD PC

1DD Mono .....	£423	20Mb Upgrade for Amstrad PC (fitted if required) .....	£345
2DD Mono .....	£522	Amstrad 1512 Mono (20Mb Seagates) .....	£760
1DD Colour .....	£567	640K Memory .....	£699
2DD Colour .....	£666	Amstrad Colour 1512 (20Mb Seagates) .....	£899
2DD Mono .....	£833	640K Memory .....	£29
20Mb Colour .....	£977	Amstrad 128K memory upgrade .....	£29

#### SUMMER SPECIALS

Tandon PCA20 .....	£1349
Mini Scribe 30 Meg card .....	£299
Tandon 20 Meg upgrade .....	£255
Tandon 20 Meg business card .....	£255

#### PRINTERS

Epson LX8000 .....	£189
Star NL10 .....	£199 inc. interface
Citizen 120D .....	£149

For further lists of printers and machines see PCW

#### ATARI

520STFM .....	£205	520STFM + Philips colour Hi-res .....	£556
520STFM .....	£305	1040STF + mono .....	£556
520STFM + mono monitor .....	£390	1040STF + Philips colour Hi-res .....	£722

#### COMMODORE

Amiga 500 .....	£204	Amiga Bridge + 5 1/4" .....	£299
Amiga 500 modulator .....	£25	PC Double Disk Drive .....	£799
Amiga I .....	£949	PC One Disk Drive 20Mb .....	£1099
Amiga II .....	£1049	AT 20Mb 1.2 Disk Drive 20Mb .....	£1775
Amiga 2000 1Mb .....	£1049		

GOVERNMENT AND EDUCATIONAL ORDERS WELCOME.

EXPORT ENQUIRIES WELCOME

STANDARD DELIVERY £5 AND NEXT DAY £8.50 – ADD 15% TO ORDER TOTAL

Comlex House, 28 Bradgate Road, Hinckley LE10 1LA

(0455) 635583. Manchester 061-976 3763

(342)

## ASHBY DE LA ZOUCHE

### ASHCOM

#### Atari hardware

520 STFM, keyboard/mouse/5 meg drive .....	£259.95
1040 STF keyboard/mouse/1 meg drive .....	£439.95
1040 SFT plus colour monitor .....	£799.95
SF 314 1 meg drive .....	£169.95

#### Commodore Amiga range

A500 4 .....	£499.95
A1010 disc-drive .....	£249.95
3.5 inch discs DS/DD guaranteed (packed in 10s) .....	£14.95

Amazing prices on peripherals and all software. All prices include VAT at 15% and P&P on UK mainland. For more information call us on (0530) 411485 or send SAE for full price list. To order send cheques/PO or Visa/Access details to the address below or phone with credit card.

### ASHCOM

10 The Green, Ashby de la Zouch, Leicestershire LE6 5JU

(437)

## LEICESTER

### EKRA TECHNOLOGY FOR AMSTRAD

● The Full Range ● Immediate Delivery ● Lowest Prices (inc VAT) ex. Mail Order  
● Authorised Dealer ● Competitive Software Training ● Professional Consultancy

#### BUSINESS SYSTEMS

Amstrad PC1512PM Dual Drive Mono .....	£499.00	Amstrad PC1640HC 20Mb hard disc colour .....	£1099.00
Amstrad PC1512HM 20Mb H Drive Mono .....	£799.00	Opus PCH dual drive mono .....	£649.00
Amstrad PCW8512 Disk based Word Processor 2 Drive .....	£449.00	Opus PCH 20Mb hard disc mono .....	£899.00
Amstrad PC1640PC Dual drive colour .....	£799.00		

#### HOME MICROS

Amstrad CPC464 Cassette based computer games pack .....	£190.43
Amstrad CPC484 Cassette based computer with colour screen, games pack .....	£285.67
Amstrad CPC6128 Disk based computer .....	£239.00
Amstrad CPC6128 Disk based computer with colour screen .....	£239.00
Sinclair SPC128+2 Sinclair Computer inc gift pack (six games and joystick) .....	£125.00

#### DOT MATRIX PRINTERS

Amstrad DMP4000 136 Col 200 CPS F/T 50 NLO .....	£299.00
Amstrad DMP3000 80 Col 105 CPS F/T NLO .....	£149.00
Amstrad DMP3160 80 Col 160 CPS F/T NLO .....	£179.00
Micro Peripheral MP480 80 Col, 480 CPS, F/T 74 NLO .....	£299.00
Cannon PW10 80A 80 Col, 160 CPM F/T 27 NLO .....	£279.00
Juki 5520 (P) 80 Col, 180 CPS F/T 30NLO .....	£369.00
Epson LX86 80 Col, 120 CPS, F/T 18 NLO .....	£249.00
Epson FX800 80 Col, 200 CPS F/T 40 NLO .....	£349.00

#### DAISY WHEEL

Micro Peripheral MP26 – 132 Col, 26 CPS .....	£229.00
Juki 6000 (F/F) 80 Col, 12 CPC .....	£179.00
Juki 6100 (P) 132 Col, 20 CPS .....	£229.00

Special Offer PC1512DM – DMP 3160 Word Star Supercalc .....

Prices exclude VAT and delivery. This is a small selection, please ring for prices of other items including hardware, software and consumables.

### EKRA TECHNOLOGY

33 Barkby Road, Leicester LE4 7HN UK. Tel: 0533 668134

(420)

## LIVERPOOL

### CITY SOFTWARE

*Specialists in:*

**AMSTRAD  
COMMODORE  
ATARI  
SOFTWARE  
AND HARDWARE**

**66 Lime Street,  
City Centre, Liverpool**  
**Tel: 051-708 7100**

(263)

## N. YORKSHIRE

### THE COMPUTER SHOP

★ Atari STFM including Basketball,  
Shanghai and Music Studio –  
£299.00

Plus  
★ 3 1/2" DS/DD 8 track 135 TPI only  
£1.50 each or £10.00 for 10.

**224 High Street, Northallerton  
North Yorkshire**  
**Tel: 0609 774129**

(356)



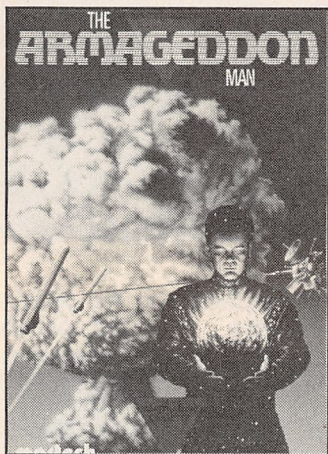
## Your complete guide to all the software released this week

### Amstrad CPCs

**Program** *Solomon's Key* **Type** Arcade **Price** £8.95 **Supplier** US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.

This coin-op conversion is something of a cross between *Boulderdash* and *Gauntlet*; there's the maze, with some nice 'lateral thinking' touches as you build or remove blocks to make your way to the screen exits. Then there's no shortage of baddies, objects to avoid or remove.

**Program** *Armageddon Man* **Type** Wargame **Price** £12.95 **Supplier** Martech, Martech House, Bay Terrace, Pevensey Bay, East Sussex BN24 6EE.



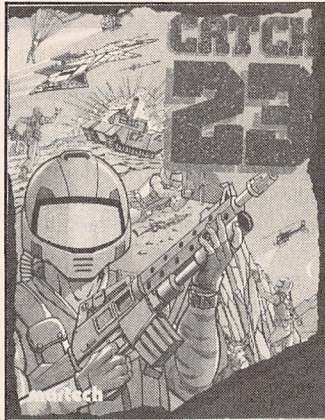
Amstrad conversion of one of the more playable wargames.

Set in the near future, the game puts you in control of world wide military and diplomatic decision making, as you attempt to avoid global warfare.

The mechanics of the game have been kept simple enough so that you don't have to be a member of MENSA to play it. See review in *Popular Computing Weekly*, August 7.

**Program** *Catch 23* **Type** Arcade **Price** £8.95 **Supplier** Martech, Martech House, Bay Terrace, Pevensey Bay, East Sussex BN24 6EE.

A combination wire frame shoot 'em up and strategy game with more locations than you've had hot dinners.



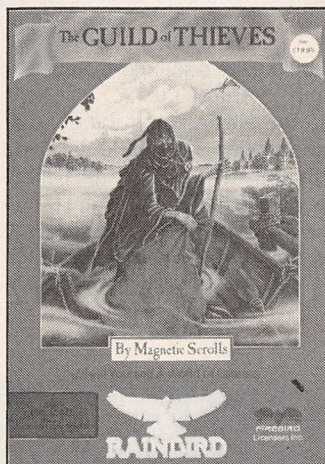
### Atari XL/XE

**Program** *Guild of Thieves* **Type** Adventure **Price** £19.95 (on disc only) **Supplier** Rainbird, 64-76 New Oxford Street, London WC1A 1PS.

You'll need a disc drive and a minimum of 64K to play this, but it's worth it.

You play a budding member of the guild attempting to prove yourself by ransacking a seemingly peaceful island.

*Guild of Thieves* is Magnetic Scrolls' follow-up to *The Pawn*, and it's just as good.



**Program** *180* **Type** Simulation **Price** £2.99 **Supplier** Mastertronic, 8-10 Paul Street, London EC2A 4JH.

**Program** *Druid* **Type** Arcade **Price** £9.95 **Supplier** Firebird, 64-76 New Oxford Street, London WC1A 1PS.

Enjoyable *Gauntlet* clone, which predated *Gauntlet* itself in its original versions, with nice graphics but perhaps not quite as frantic as *Gauntlet* itself.

continued on page 51 ►



**A**ccolade's *Comics* didn't turn out to be quite what I'd expected. The game casts you in the role of Steve Keene, a private detective on the track of a kidnapped scientist.

Unlike a conventional arcade or adventure game, this game unfolds in front of you in the form of a comic strip, with the individual frames of artwork being 'drawn' on to the screen each time you press the fire key/button or make a decision.

It's in the same mould as Melbourne House's *Mugsy* and *Red Hawk*, and while it's undoubtedly slicker – and bigger – this type of game obviously still has some way to go before the comic strip idea works smoothly throughout.

All the advance information I'd received went on about the game being a 'living' comic strip in which you could interact with the characters you'd meet and affect the outcome of the game. I was expecting some sort of sophisticated parser that would allow you to enter text as you would do in an adventure, but the interaction turned out to be a bit more limited than that.

Many of the frames that make up the storyline are 'fixed'. You can't affect them in any way and simply read the captions for any information that they might present, or you can watch the limited animation in some of them.

In the parts that you can control, interaction consists of moving the joystick up or down to select a caption from a choice of three or four. Some places you may have a choice of objects to pick up, or exits to choose from, and this is done by moving an arrow to the appropriate choice.

There is no entering of your own text commands from the keyboard at all, so, as you might suspect, the interaction is really quite limited. This is especially so as, in many places, the choice of captions is simply a choice between a number of equally inane wisecracks.

You do get a number of lives in the game, and if you reach an 'endpoint' by making a wrong decision somehow, you can go back to a point just before that decision and re-run your actions.

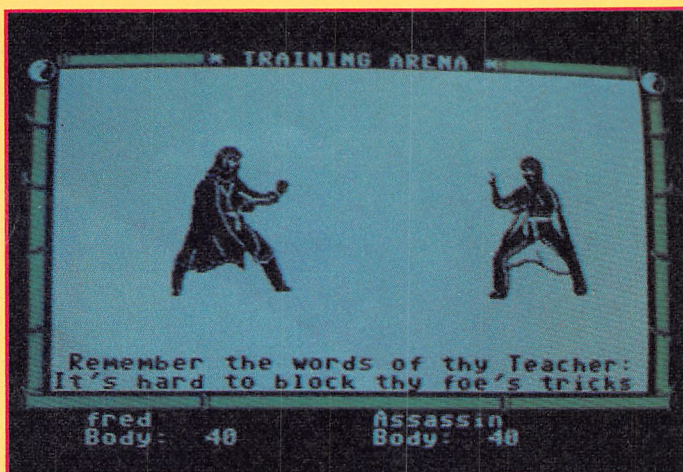
There are also some simple arcade sequences that provide the occasional change of pace.

*Comics* is by no means a bad piece of software. A lot of care has gone into the presentation of the game, and like any good cartoon strip it's quite entertaining to read/watch once or twice. But, like most cartoon strips it probably won't draw you back for repeated viewings.

Cliff Joseph

**Program** *Accolade's Comics* **Type** Comic strip simulation **Machine** C64 **Price** £29.99 on disc **Supplier** US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.





The mechanic that would perfect his work must first sharpen his tools."

I'd like to know how you go about sharpening a monkey wrench, but then that sort of inscrutable waffle is an occupational hazard when you're reviewing martial arts games.

Ever since the release of Melbourne House's *Exploding Fist* the stream of kick 'em ups has hardly ceased, and this week sees the release of yet another, though this is a bit more ambitious than most.

Microprose's *Moebius* looks enormously promising to begin with. Taking up two double-sided discs, the game adds elements of role-playing to all the usual violence.

It seems that some chap called Kaimen has strayed from the path of wonderfulness (that's what comes of sitting in laundries in boxer shorts), and run off with the Orb of Celestial Harmony.

As a result, the land of Khantun is going to rack and ruin - floods, plagues of giant beetles, young Conservatives, you name it, they've got it.

It is up to you, as a disciple of Moebius the Wind Walker, to learn the sacred disciplines and set off in search of the Orb in order to put things to rights.

At the start of each game you have to name the disciple that you wish to play (you can store any number of disciples on disc), and take him/her through three disciplines: karate, sword-fighting and divination. The first two are animated combat sequences, as you might expect. You can choose the speed of the action here, but even at top speed the action is a little sluggish.

Things aren't helped by the choice of keyboard controls, which I found rather cramped,

and the game will not accept a joystick or allow you to define your controls.

Divination is an odd routine in which a yin-yang symbol attempts to escape from a chamber, and you have to keep it closed in.

Fortunately, it doesn't take too long to master these tasks (although divination seems a bit random), which is just as well because you can't start the main adventure until you've done this.

Once you're loose in the land of Khantun you have to penetrate the four planes of fire, air, earth and water to reach the Orb.

Along the way you will encounter a variety of assassins, guards, evil priests and the like, who will do their best to destroy you. Or, an even worse fate is if you allow them to blot your Karma, and tempt you from the path of purity so that you are unworthy of possessing the Orb.

As you progress across the planes, you can interact in a simple manner with some of the characters you will meet.

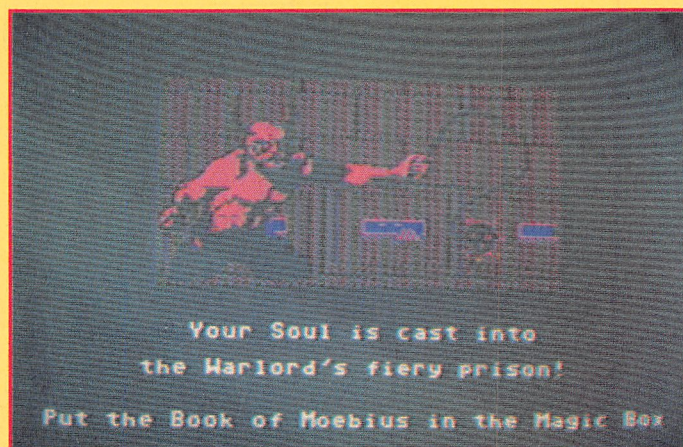
## Mysticism meets martial arts

There is also a system of magic use, allowing you to learn how to casts spells. The simplest of these is hurling fire balls, but as you meditate and pray, and gain experience in other ways you will be able to attempt the Major magic spells (teleport, invisibility, and so on).

All this adds to the variety of the game, making it a bit like a Kung Fu role playing game, rather than pure combat. But it

are represented by large block-like graphics, reminiscent of an old maze game. The map does scroll, and your figure moves across the landscape (one block at a time), but you couldn't really describe the process as 'animation'.

The author, Greg Mallone, had the right idea in trying to give *Moebius* more depth than most of the other martial arts games, but the implementation



could have been more elegantly implemented, I think.

The animation in the combat sequences is perfectly fine (though a bit slow, as I mentioned), but the rest of the game is more cumbersome. As you wander around Khantun, the landscape and your own figure

doesn't live up to the game's ambitions.

Cliff Joseph

**Program** *Moebius* **Type** Martial arts **Micro** C64 **Price** £19.95 disc only **Supplier** Microprose/Origin, 2 Market Place, Tetbury, Glos GL8 8DA.

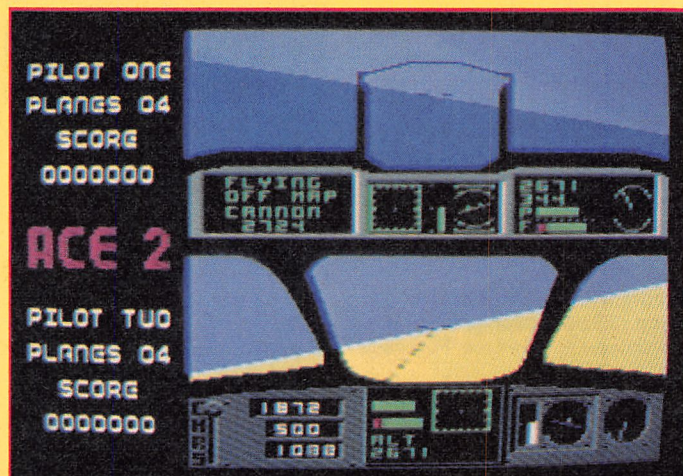
## Cascade: ACE 2

In New Releases, August 21, we published a colour picture alongside the review of *ACE 2* by Cascade.

You probably realised that the picture was largely decked out in PC compatible mauve, and therefore not all that it should be.

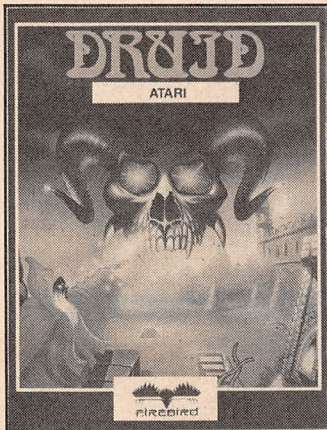
And you'd be right. We'll come clean. The picture was actually a screen from *Chuck Yeager Flight Trainer*.

The genuine *ACE 2* screen is shown right, from the Commodore 64.





◀ continued from page 49



## Atari ST

**Program** *Championship Baseball* **Type** Sports simulation **Price** £24.95 **Supplier** Activision, 23 Pond Street, London NW3 2PN.

The Spectrum version of this was released a couple of months ago, and I found the graphics and animation rather disappointing.



**Program** *Wiz* **Type** Arcade **Price** £8.95 tape, £14.95 disc **Supplier** Melbourne House, 8-10 Paul Street, London EC2A 4JH.

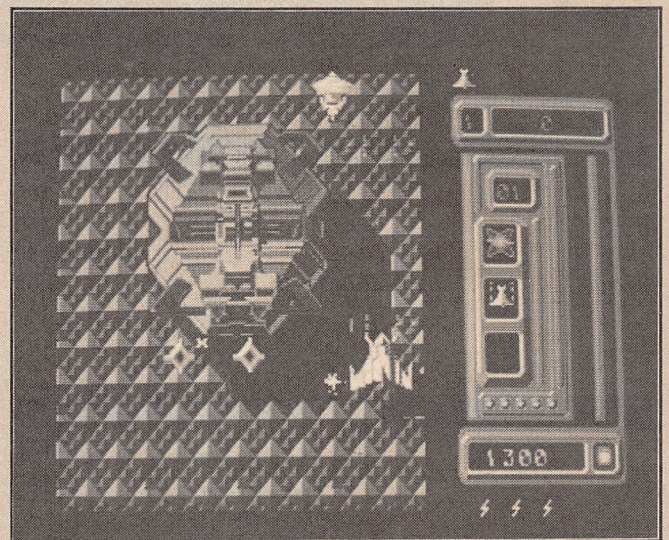
**Program** *Revenge II* **Type** Arcade **Price** £2.99 **Supplier** Mastertronic, 8-10 Paul Street, London EC2A 4JH.

The return (yet again) of Jeff Minter's mutant camels. This sequel, set 6000 years after the last game, is basically more of the same crazed shoot 'em up action that you've come to expect from Minter.

It's a little less straightforward to control the camels in this game, but if you want to see camels being bombarded by flying Y-fronts then this is the game for you.



continued on page 53 ▶



Until now you could count the number of good shoot 'em ups for the Amiga on the finger of one hand. That game was *Starglider*, of course. But now, from deepest Cornwall, comes this conversion of the superb *Goldrunner*.

Your task is this: the Earth is dying of pollution (that's what you get for ignoring ecology groups) so a mass migration is on the cards. Unfortunately between here and the unlucky planet that you're moving to lie the ringworlds of Triton.

These Tritonites don't have the sense to set up a toll booth so you have to fight your way through. Large ships are too big so it's a job for a one man fighter (yeah, yeah).

You fly a fighter ship over the horizontally scrolling terrain, blasting at surface installations until you've reduced the power in that ring to zero. Then you find the exit and progress onto the next ring, after going through a bonus screen.

Although you can fly through the enemy fighters undamaged, their missiles are far more deadly. For one thing, when you change direction they do as well, so that they continue homing in on you.

The other things to watch out for are the large ground installations which you can run into with the expected fatal results.

Your ship comes armed with double firepower, a turbo booster to get out of those tight situations, and five armour points. Each hit you take reduces your armour and eliminates the booster, then goes the double firepower, and finally your life.

The terrain graphics are exactly the same as on the ST original so it's a pity more use wasn't made of the Amiga's extra 16 colours in this mode. The scrolling, when the booster is used, simply has to be seen. Even allowing for the fact that the playing area is only 70% of the screen, the scrolling is outrageously fast.

The accompanying music is less tinny and slightly more complex than on the ST, and still pretty good. The only other differences between this version and the original is that there is no joystick option, and the alien ships are different, and more well defined.

*Goldrunner* is undeniably the best shooting game for the Amiga, so far, but even so, this excellent game is surely only a foretaste of what the machine is really capable of.

Duncan Evans

**Program** *Goldrunner* **Micro** Amiga **Price** £24.95 **Supplier** Microdeal, PO Box 68, St Austell, Cornwall.

## Acorn/Archimedes

**Program** *DeltaBase* **Type** Database **Price** £29.95 **Supplier** Minerva Systems, 69 Sidwell Street, Exeter EX4 6PH.

There are a few press releases flying around from various companies claiming to have the first releases specifically for the Archimedes, but this is the first finished program to arrive here at *Popular*.

I don't know whether all those would-be owners out there are wait-





# ZONEFOUR LTD

## All disks now sent 1st class or courier



### MIMIC IN FREE LIBRARY CASES

DS 96 TPI	10s	£7.60
FLIPSIDED	10s	£7.15
DS 48 TPI	10s	£6.80
UNIVERSAL	10s	£7.95

### MIMIC 3.5"

SS	10s in Library Case	£13.55
DS	10s in Library Case	£15.95

### 5.25" BULK UNBRANDED DISKS (LIFETIME GUARANTEE)

FULLY CERTIFIED	SS 48 TPI	SS 96 TPI	DS 48 TPI	DS 96 TPI
Try 10 and see	£4.75	£5.55	£5.55	£6.35
25	£9.60	£10.40	£10.40	£11.20
50	£18.40	£19.20	£19.20	£20.80
100	£33.60	£35.20	£35.20	£36.80
250	£76.00	£77.60	£77.60	£80.00
500	£144.00	£148.00	£148.00	£152.00

AMSOFT CF2 3"	10s	£20.00
MAXELL CF2 3"	10s	£20.00
3" MIMIC CF2DD	10s	£26.40

### ACCESSORIES INC VAT

IBM/Amstrad PC1512 Printer Cable GPR10125 x cent.	£7.15
Disk Notcher/doublers	£3.60
Disk cleaners 3.5"	£3.95
5.25" cleaner	£3.60
Mini Vac for printers and keyboards	£5.55

### 5.25" BULK COLOUR UNBRANDED

FULLY CERTIFIED	SS 48 TPI	SS 96 TPI	DS 48 TPI	DS 96 TPI
10*	£7.15	£7.95	£7.95	£8.75
25	£17.60	£19.20	£19.20	£20.80
50	£32.00	£36.00	£36.00	£38.40
100	£60.00	£64.00	£64.00	£72.00
250	£140.00	£152.00	£152.00	£160.00
500	£272.00	£208.00	£208.00	£300.00

### RED, GREEN, BLUE, YELLOW, WHITE

10 in single colour OR 2 of each please state in large quantities your choice. (If stocks are available) \* in library cases

### 3.5" BULK UNBRANDED DISKS 135 TRILIFETIME GUARANTEE

	SS	DS
10	£11.95	£13.55
25	£28.00	£32.00
50	£52.00	£64.00
100	£96.00	£120.00
250	£220.00	£280.00
500	£400.00	£520.00

### AMIGA HARDWARE

A500 Amiga	£475.00
Cumana compatible 1 meg disk drive	£140.00
Modulator	£24.95

### MIMIC HIGH DENSITY COBALT COATED 1.6 MEG SUITABLE FOR A.T.S.

10	50	100
£14.40	£64.00	£120.00
Verbatim preformatted for use with Kodak 6.6 meg drive or equivalent (5 Pack)		
		£90.00

### DISK BOXES INCLUDING VAT

5.25"	50 capacity £6.95	100 capacity £9.35
3.5"	40 capacity £6.80	80 capacity £9.55
3"/3.5"	80/90 capacity £9.55	
10 x 3.5" or 5.25" (library case)	£1.20	

### SOFTWARE

We sell the full range of SAGE POPULAR SOFTWARE	
ABC All in One Business Package	£150.00

ALL 5.25" DISKS HAVE REINFORCED HUB RINGS, SLEEVES, LABELS AND WRITE PROTECTS.

ALL DISKS CARRY A LIFETIME GUARANTEE.

ALL DISK PRICES INCLUDE VAT AND P/P.

TO ORDER PLEASE CALL DIRECT DISK LINE: 10AM 6PM

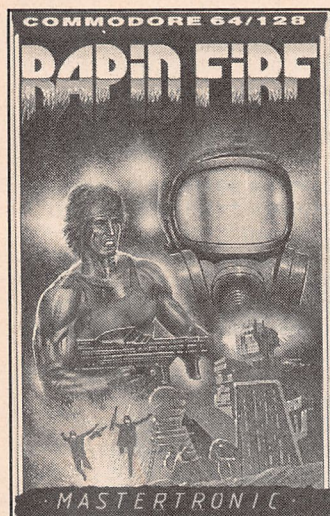
**Please Note:** We can now offer you a duplicating service and in-house printing, packaging and most services you require. If you require any of these services, please telephone for a quotation on 0707 331076.

**ZONEFOUR, Unit 11, Mundells Court, Welwyn Garden City, Herts. Tel: 0707 334460**

Please call for bulk and seasonal prices and a full list of Paper, Labels, etc. etc. and new catalogue



◀ continued from page 51



**Program Rapid Fire Type** Arcade **Price** £1.99 **Supplier** Mastertronic, 8-10 Paul Street, London EC2A 4JH.

See Spectrum for comment.

## Spectrum

**Program Wiz Type** Arcade **Price** £7.95 **Supplier** Melbourne House, 8-10 Paul St, London EC2A 4JH.

**Program Sample Editor Type** Music utility **Price** £9.99 (mail order only) **Supplier** Quasar Software, 83 Clerkenwell Road, London EC1.

A sound sampler/editor for use with Ram Electronic's Music Machine interface.

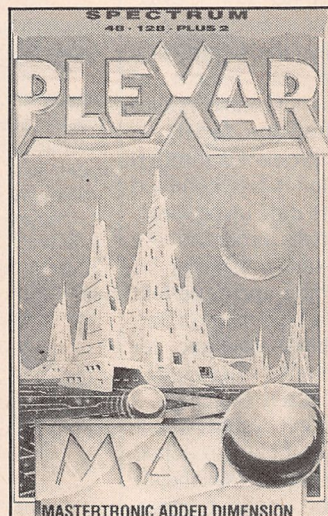
**Program Rapid Fire Type** Arcade **Price** £1.99 **Supplier** Mastetronic, 8-10 Paul St, London EC2A 4JH.

All rather misleading. The inlay picture is reminiscent of Rambo; the plot is one of slum gang warfare. And where did the "Rapid" of the title come in?

**Program Plexar Type** Arcade **Price** £2.99 **Supplier** Mastertonic, 8-10 Paul Street, London EC2A 4JH.

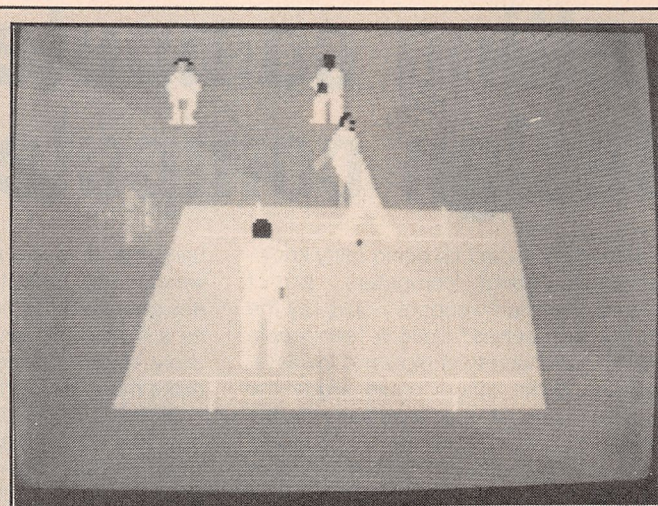
Another nice budget game on the Bulldog label. *Plexar* puts you in control of a bouncing alien attempting to boing his way along a series of booby-trapped highways. A bit like a budget version of *Trailblazer*, with nice graphics and smooth animation.

**Program Shard of Inovar Type** Arcade **Price** £1.99 **Supplier** Bulldog, 8-10 Paul Street, London EC2A 4JH.



**Program Hack Pack Type** Utility **Price** £2.50 (available by mail order only) **Supplier** Softlink, 19 Dunloy Gardens, Newtown Abbey, Co. Antrim BT37.

A cassette containing over 100 pokes (infinite lives, etc.) for almost as many games. The games are all fairly recent or popular ones, though a major oversight is the lack of pokes for *Head Over Heels* (because I need some).



Now that the summer appears to be over and it's raining buckets all over the place, what better way to spend the time than with a nice game of cricket (I can think of several ways actually, but for the purpose of this review let's just pretend that cricket and nirvana are more or less next door to each other).

Audiogenic's follow-up to *Graham Gooch's Test Cricket* is *Graham Gooch's All Star Cricket*. The sequel is basically a two-player game with one player representing England and the other Australia.

There are two modes of play; simulation or arcade. In simulation mode you select the teams and sit back and watch while the two teams slog it out on their own as in the original; in arcade mode you actually get to play.

You get to control both batting and bowling for each team, and both processes are kept nice and simple. When bowling, you first choose between off side or leg side and pressing the fire button starts the bowler's (very short) run-up. Then it's just a matter of timing the release of the ball for the best result.

Batting works on the same principle; once the bowler makes his delivery you have to time your strike as accurately as you can. Too soon and the ball will probably be an easy catch, too late and the wicket gets blown all over the place. But if you get it just right, you'll be rewarded with the ball apparently zooming right out of the screen towards you.

Sensibly, there's also a practice mode that gives you an indication of the best approach to both bowling and batting, and some reasonable but limited voice synthesis for 'Howzat' and crowd noises – a new feature of the *All-Star* version. You can select teams from the names that the computer has on file or enter your own, and the numbers of innings and overs can also be selected. All the fielding is automatic – once the ball has been hit the computer takes over, so that side of things is out of your hands.

The game is enjoyable enough although the action isn't terribly varied, being more or less limited to hitting the fire button and getting the timing right.

To be honest, if you've already got the original *Graham Gooch*, the extras in this new edition probably don't justify buying the *All-Star* version. I think you'd have to be quite a cricket buff to take a lot of interest in the business of selecting players and the numbers of overs and so on, but then, with most sports simulations you have to be fairly keen to get the most out of them anyway.

Cliff Joseph

**Program Graham Gooch's All-Star Cricket Micro** C64 **Type** Sport simulation **Price** £9.95 (£11.95 on disc) **Supplier** Audiogenic, PO Box 88, Reading, Berkshire.

## CHARTS

### Top Twenty

- |    |      |                         |
|----|------|-------------------------|
| 1  | (1)  | Milk Race               |
| 2  | (2)  | BMX Simulator           |
| 3  | (3)  | Road Runner             |
| 4  | (4)  | Run for Gold            |
| 5  | (5)  | Exolon                  |
| 6  | (6)  | Paperboy                |
| 7  | (10) | Barbarian               |
| 8  | (7)  | Destructo               |
| 9  | (13) | Kik Start 2             |
| 10 | (11) | The Last Ninja          |
| 11 | (9)  | Cricket International   |
| 12 | (14) | Gauntlet                |
| 13 | (19) | Living Daylights        |
| 14 | (-)  | Super Robin Hood        |
| 15 | (-)  | Back to the Future      |
| 16 | (20) | Football Manager        |
| 17 | (8)  | World Class Leaderboard |
| 18 | (-)  | Avenger                 |
| 19 | (-)  | Feud                    |
| 20 | (-)  | Olympic Spectacular     |

Mastertronic  
Code Masters  
US Gold  
Alternative  
Hewson  
Elite  
Palace  
Bulldog  
Mastertronic  
System 3  
Alternative  
US Gold  
Domark  
Code Masters  
Firebird  
Addictive  
Access/US Gold  
Gremlin Graphics  
Bulldog  
Alternative

All figures compiled by Gallup/Computer Trade Weekly



# Letting computers design computers

I would class myself as being fairly knowledgeable about computers, and I expect that many readers would say the same for themselves. Quite a few people can program a variety of high and low-level languages, while others could argue the pros and cons of any machine on the market. However, if I were to pose the question: "How many of us could design a micro-chip from scratch?", I think that a lot of us would feel less than confident with regard to our capabilities.

So what? It's not necessary to know the workings of a car to drive one, let alone know how to build one from scratch. There are any number of car manufacturers who are willing to take this responsibility for us. But if we take a closer look at the computer manufacturers, we can see that the vast majority use ready-made CPUs bought from micro-chip manufacturers. In other words, most computer companies don't know how to build a chip from scratch either.

Moving on, it strikes me that as technology progresses, becoming ever more complex, the longer it must take to train someone from novice to expert status in any affected field. The only ways in which people can keep up are either to learn faster, or start at a higher level of knowledge in the first place. One possible way of doing this is to remove the need to know all the intricate details of computer design.

This is, of course, what is already happening. In order to reduce training time, increase productivity, and improve quality, chip manufacturers use sophisticated computer-based CAD systems to do most of the work and optimise the final results. They are using computers to design computers.

It is my view that sooner or later (most likely later), new computers will be entirely designed and built by other computers, and us humans will have no hope of fully

understanding the new systems. For now we can argue that the computer doing the designing will still have to be programmed by a human. However, this will not necessarily always be the case, and it may not make much difference anyway.

With the huge processing power available and complex artificial intelligence systems progressing rapidly, the actual program merely provides the means of manipulating data via a set of initially preset rules. If the program has the facility to formulate its own rules, produced through its own 'experiences', then it may continue to process and re-process data using methods beyond those originally programmed. The computer is not exactly thinking for itself; it just uses pure logic and a perfect memory of previous attainments and failures to reach an optimal solution; for example to the arrangement of logic gates or tracks on the surface of a micro-chip.

Can you imagine an expert system where you weren't able to query how it reached certain conclusions? Or more realistically where you could ask but wouldn't understand the reply? The only reason the computer may have the answer is because it has tested every one of the millions and billions of possible solutions and part-solutions. It has no more idea of 'why' than we do; the only answer it can give being 'because it is'.

The idea of computers designing their 'successors' will not be unfamiliar to readers of *The Hitchhikers Guide To The Galaxy*, and it probably doesn't sound quite as absurd as maybe it should. I don't believe that computers will ever 'take over the world'; however, it's always possible that a new design may one day get rid of the major bottleneck in any computer's operations: the human user.

G Ambler

## Puzzle No 273

Jamie dealt out a standard pack of 52 playing cards, face down on the table, in a straight row. Starting at the left hand end he turned over each card in turn until all 52 cards were face up. Starting again at the left, he turned over the first card, and then turned every other card. That is, he turned cards 1, 3, 5, 7, 9, ... and so on to the end of the row.

He then repeated the procedure by turning the first card and every third card (ie 1, 4, 7, 10, ... etc). He then continued in this way right up to a jump of 52. In this final case, of course, he was only able to turn over the first card as a jump of 52 cards took him past the end of the row of cards.

When the final card was turned up, how many of the cards were now face up?

## Solution to Puzzle No 268

Answer: A = 10 B = 14 C = 12 and D = 64.

This problem is best tackled by taking pairs of values which interlock in the grid. In the program, values are taken initially for B and D as D interlocks with B squared, and D squared interlocks with B squared. Only when acceptable values are found are A and C considered.

The range of these values are from 10 to 31 for A, B, and C as they have three-digit squares, and 32 to 99 for D, as it has a four-digit square. In addition, 5 across (B<sup>2</sup>) must end in a digit of 3 or greater as this end digit forms the first digit of D.

```
10 FOR B=12 TO 19: B$=STR$(B)
20 X=B*B: X$=STR$(X)
30 FOR D=32 TO 99: D$=STR$(D)
40 IF MID$(D$,1,1)<>MID$(X$,3,1) THEN 280
50 Z=D*D: Z$=STR$(Z)
60 IF MID$(Z$,3,1)<>MID$(X$,2,1) THEN 280
70 FOR C=10 TO 31: C$=STR$(C)
80 IF MID$(C$,1,1)<>MID$(X$,1,1) THEN 270
90 Y=C*C: Y$=STR$(Y)
100 IF MID$(Y$,2,1)<>MID$(Z$,1,1) THEN 270
110 FOR A=10 TO 31: A$=STR$(A)
120 IF MID$(A$,1,1)<>MID$(Y$,1,1) THEN 260
130 R$="": W=A*A: W$=STR$(W)
140 FOR F=1 TO 3
150 R$=MID$(W$,F,1)+R$
160 NEXT
170 IF MID$(R$,1,1)<>MID$(A$,2,1) THEN 260
180 IF MID$(R$,2,1)<>MID$(Z$,2,1) THEN 260
190 Q$=""
200 FOR F=1 TO 2
210 Q$=MID$(R$,F,1)+Q$
220 NEXT
230 IF MID$(Q$,1,1)<>MID$(Y$,3,1) THEN 260
240 IF MID$(Q$,2,1)<>MID$(R$,3,1) THEN 260
250 PRINT "A=";A$; " B=";B$; " C=";C$; " D=";D$
260 NEXT A
270 NEXT C
280 NEXT D
290 NEXT B
```

## Winner of Puzzle No 268

This week's winner is Kevin Hebbard of Tilbury, Essex who will receive £10.

## Rules

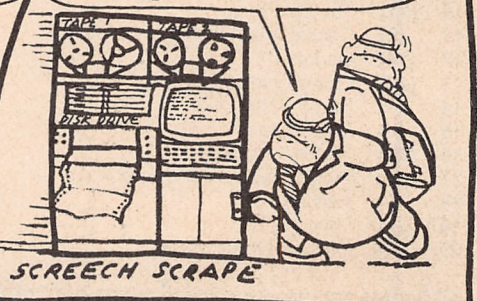
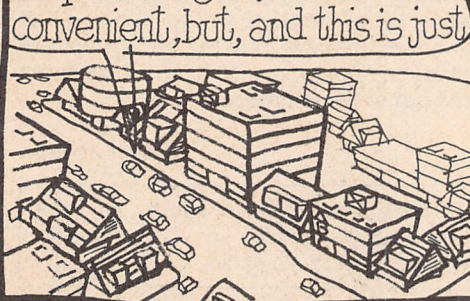
The closing date for Puzzle 273 is September 23.

# HACKERS

It's the world's first wristwatch computer Douglas, AMAZINGLY convenient, but, and this is just...

my opinion you understand, if they're ever going to catch on,...

they'll need to get the size & weight down a bit.





# STAND OUT FROM THE CROWD..

ONLY  
£149.95  
+ VAT



BE UNIQUE WITH

## ☐ BOOK-KEEPING

Full double-entry Accounts made easy. Includes SALES ledger with INVOICING and STOCK CONTROL, PURCHASE ledger, CASHBOOK, NOMINAL ledger. All integrated.

## ☐ TYPING

WORDPROCESSOR designed for producing business letters quickly – includes MAIL MERGE and CALCULATIONS.

## ☐ FILING

Card-Index DATABASE with report generator and LABEL Printing. Can be used on the Book-keeping Files and with Typing.

## ☐ CALCULATIONS

SPREADSHEET for simple Cashflows, Costings Forecasts and Estimates.

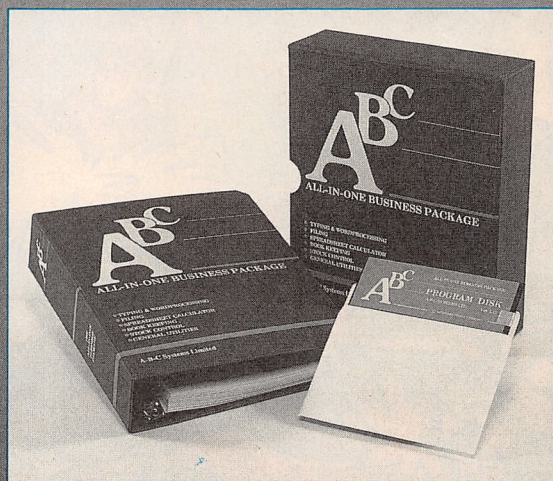
Plus ....

Electronic NOTEPADS, PHONEBOOK, DIARY, Printing CALCULATOR, HELP Screens, 3 levels of PASSWORDS, Disk UTILITIES ... and more. All on one disk! All integrated and easy to use! ABC runs on any IBM PC or compatible.

**STOP PRESS.....**  
**FREE DEMO PROGRAM AVAILABLE**  
**WITH FULL INSTRUCTIONS**

# ABC

ALL-IN-ONE BUSINESS PACKAGE



"... Designers (of ABC) have a good grasp of the practical, day-to-day need of small businessmen or self-employed person ... could well be the only package you will ever need."

MICRO-DECISION – APRIL 1987

Available from:

SOFTSA

01-568 8866

CENTRESOFT

021-356 3388

LEISURESOF

0604-768711

GEM DISTRIBUTION

0279-412 441

FIRST SOFTWARE

0256-463344

... and all other leading distributors

ABC Systems Ltd. Regent House, 188 High Street, Sutton, Surrey. SM1 1HH Telephone: 01-661 0488



# MORE FUN THAN A BARREL FULL OF MONKEYS

# JACK IN COCONUT CAPERS

## THE NIPPER... II

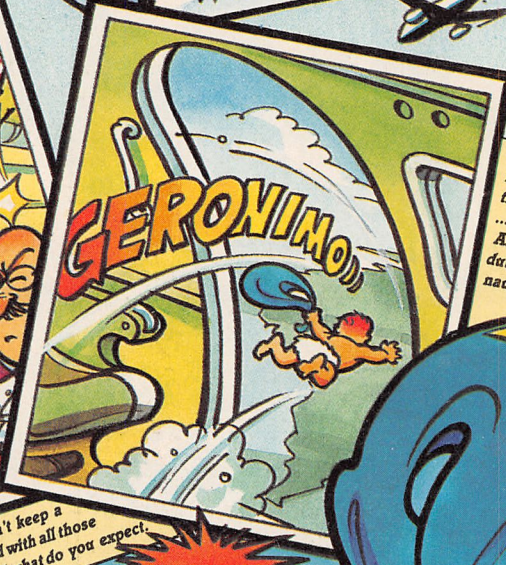
Help! Stop! The country has had enough, no more can it take of the devilish pranks and obnoxious behaviour of darling little Jack. Off to a land where many of your kind were banished long before. Off to Australia Jack you must go!!!



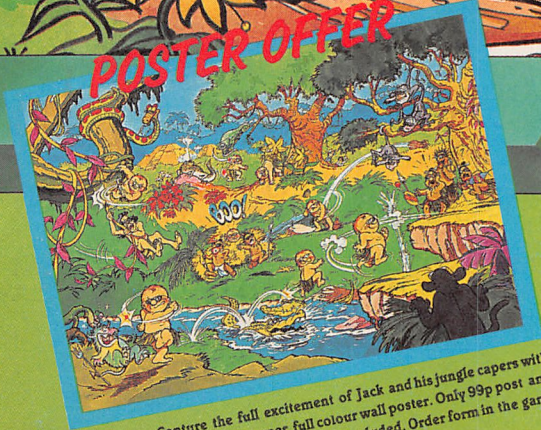
"I don't like your stinking climate anyway you \*cough!\* splutter... igs. There's plenty of places just waiting for me. Ha!!" bluffed Jack defiantly.



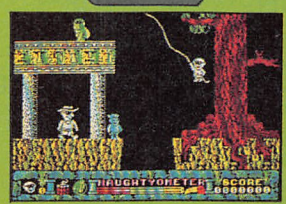
On the ground, in the air, you can't keep a mischief maker out of trouble and with all those pretty air hostesses around ... well what do you expect.



It's no fun being cooped up. Maybe there's something down there that fancies being mugged ... bitten ... spat at or pinched. As ever poor Mam and Dad dutifully follow their nauseating little offspring.



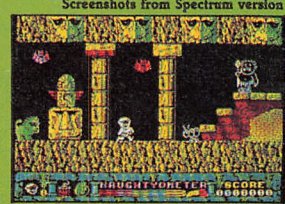
Capture the full excitement of Jack and his jungle capers with this super full colour wall poster. Only 99p post and packing included. Order form in the game.



**CBM 64/128**  
Cassette £9.99 Disk £14.99



**SPECTRUM 48/128K**  
Cassette £7.99



**AMSTRAD**  
Cassette £9.99 Disk £14.99

Gremlin Graphics Software Ltd.,  
Alpha House, 10 Carver Street, Sheffield S1 4FS  
Tel: (0742) 753423